DRAFT

MARKET SEGMENT PROFILE

FOR

AT&T MARKET ASSESSMENT

THE INFORMATION SERVICES INDUSTRY

INPUT
PARK 80 PLAZA WEST 1
SADDLE BROOK, NJ 07662

AUGUST 8, 1983

Y-GFP
1983
c.1

AUTHOR

TITLE MARKET SEGMENT PROFILE FOR
ATT MARKET ASSESSMENT

DATE LOANED	BORROWER'S NAME

CAT. No. 23-108 PRINTED IN U. S. A.

I. PROFILE PURPOSE, METHOD AND SCOPE

The Market Segment Profile is a foundation document for industry information and analysis. It is intended to be used as an input to a larger process by ATTIX Market Assessment to determine future telecommunications opportunities. The profile is a future-facing document designed to assist in determining customer needs by industry in the 1985 to 1990 timeframe. The document is intended to distill and organize a wide range of industry information which includes:

- Summary industry financial and economic data
- Descriptive data on leading firms
- Basic product and service descriptions
- Industry structure, capital and labor characteristics
- Technological and automation trends
- Telecommunications requirements and usage
- Other industry-relevant data and analyses

In each instance the latest available data has been gathered, and efforts have been made to assure comparability across industries by employing consistent sources to the extent possible. The method employed has been to search intensively the following classes of sources:

- United States Government documents
- Annual reports of public companies
- Trade association publications
- Trade periodicals

Digitized by the Internet Archive
in 2015

https://archive.org/details/marketsegmentprounse

- Public and quasi-public industry market research
- General business publications and periodicals
- Interviews (unstructured) with industry experts
- Bell System data

Information was obtained consistent with an approved "Generic Profile Format" developed jointly by ATTIX Market Assesment and a management consulting firm. The data gathered were subjected to a variety of analyses and cross-checks for reasonability, particularly in the case of economic data. Financial data were aggregated into representative groups of firms when appropriate.

As analyzed, each industry is consistent with ATTIX Market Management Sectors (MMS) codes and is traceable to three and/or four digit Standard Industrial Classification codes (SIC). In each industry efforts were made to supply data in time series form so as to detect trends. Further, most data are obtained from regularly published sources so that maintenance and updating of the profiles will be facilitated. All data conform to standard economic and financial definitions unless a non-standard definition is cited within the text of the Market Segment Profile.

II. PROFILE SUMMARY

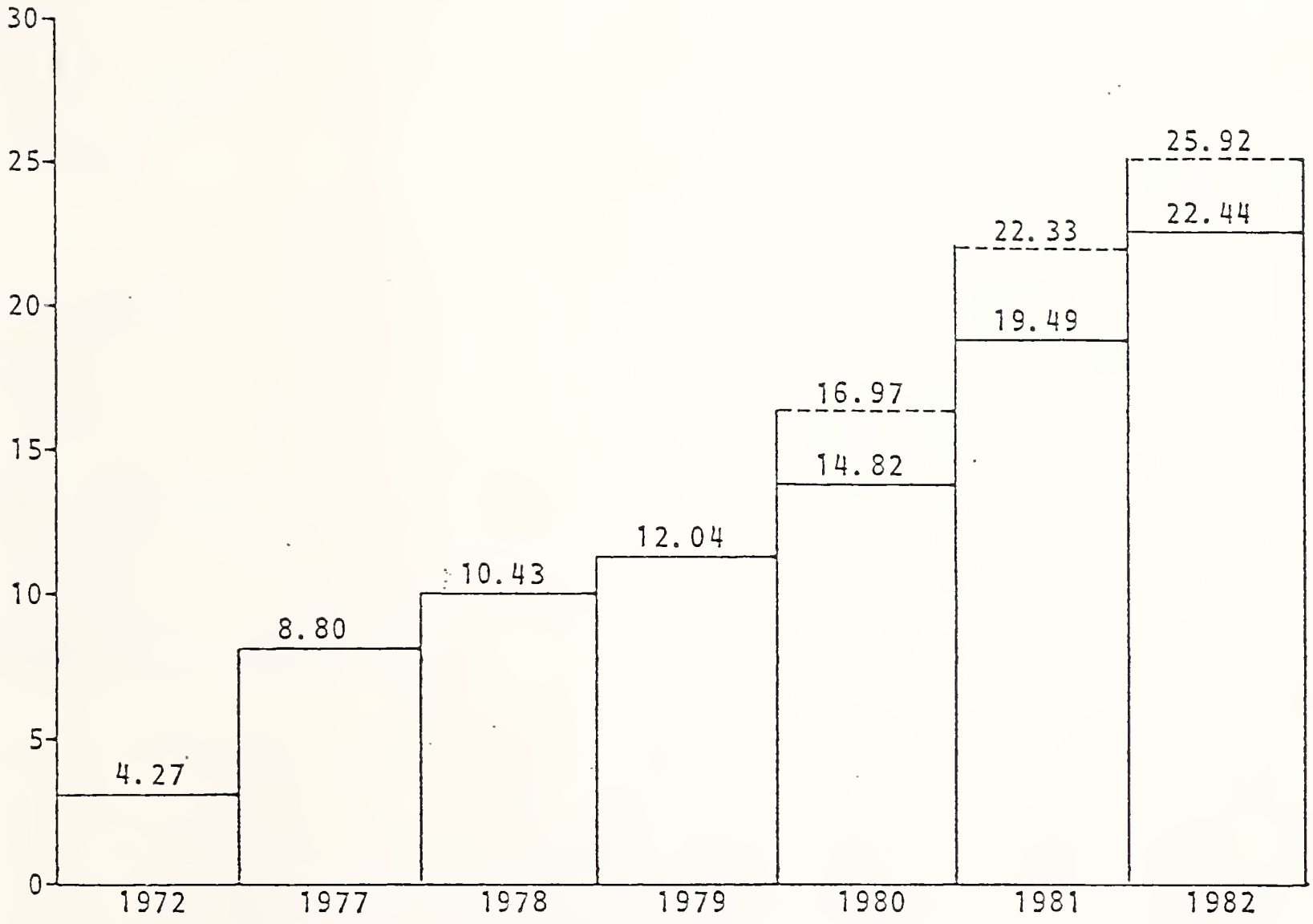
A. Basic Industry Trend Data

1. Industry Sales - The Information Services Industry is large and growing rapidly. In the ten years 1972 to 1982 user expenditures grew from $4.3 Billion to $22.4 Billion for an average of 18% per year compounded. Growth during the 1981-1982 recession was modestly retarded over the average for prior years but was still 15.1%.

While the industry is large and growing rapidly, there is no dominant firm. An estimated 6,000 firms participate in the industry and maintain in excess of 12,000 establishments, excluding one-person firms. For the year 1982 only nine firms reported publicly achieved revenues in excess of $100 million, further emphasizing the lack of concentration in the industry. In addition to these nine publicly reporting firms there are approximately 20 organizations with Information Services Industry revenues exceeding $100 Million which are divisions of other firms engaged in a variety of activities such as finance and manufacturing.

Regarding the industry's revenues, a number of schemes have been developed for segmentation. The method adopted by the industry's primary trade association ADAPSO (Association of Data Processing Services Organizations) distinguishes two main categories and a number of other segments. These two categories are "Processing Services" and "Software Products" with revenues of $11.4 Billion and $11.0 Billion respectively. A third category, Integrated Systems has been added in recent years with 1982 revenue of $3.5 Billion.

TOTAL
INFORMATION SERVICES INDUSTRY
CURRENT $ BILLIONS



AAGR 1972-82 = 18.0%
AAGR 1977-82 = 20.6%

NOTE: Dotted lines indicate revenues for integrated systems, a service type tracked since 1980. Growth rates shown for 5 and 10 year periods do not include integrated systems. Were data available, the effect would be to raise the rate of growth by 1-2 percentage points, 1977-1982.

SOURCE: INPUT

With these major categories 1982 revenues and forecast values for 1987 are as follows:

PROCESSING

Remote Computing

Batch

Facilities Mgmt.

SUBTOTAL

SOFTWARE

Systems

Applications

Professional Svcs.

SUBTOTAL

INTEGRATED SYSTEMS

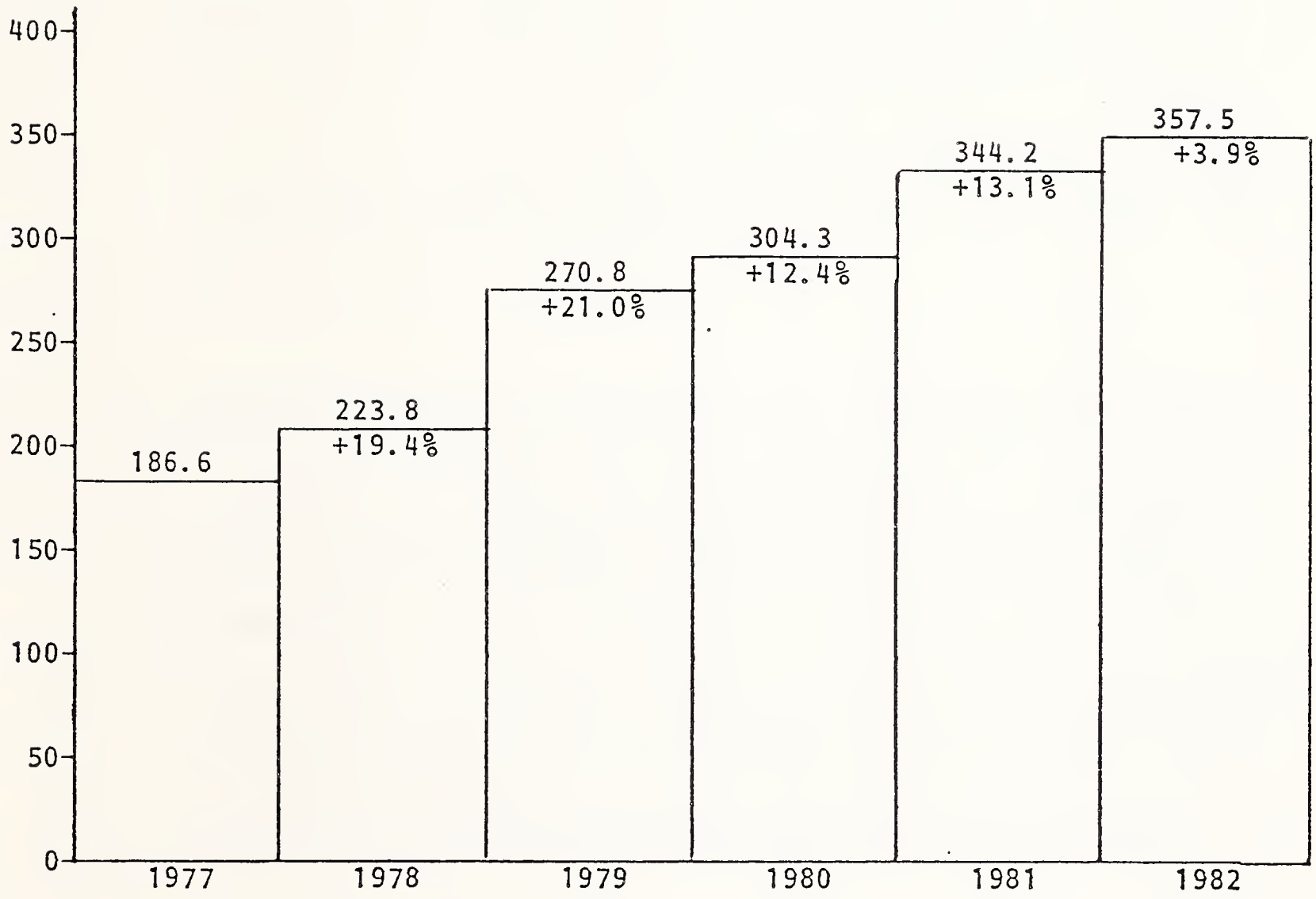
Forecast data indicates continuing rapid growth for the industry. However, the relative market share of the two primary modes -- processing and software--shifts substantially during the forecast period. The processing service share at 44% in 1982 slips to 30% in 1987. This share slippage constitutes an extension and acceleration of current trends. Since the processing sector is much more communications-intensive than the software sector, this implies slackening of communications demand from this industry relative to its revenues. For example, Remote Computing Services grew at a rate of 21.5% per year 1975-1980 but are expected to grow at 17% from 1982 to 1987.

Overall, the rapid growth of the industry and its consequent strong increase in employment suggests high demand for communications services with some differential effects. We would expect, for example, that WATS would continue to grow very rapidly while data private line might grow less rapidly as a result of the reduced expansion rates of Remote Computing Service Firms.

2. Industry Employment - Industry employment rose spectacularly from the post-recessionary year of 1977 to 1981 as measured by the Bureau of Labor Statistics. 1977 employment by this measure was 186,600 persons which rose to 344,200 by 1981 for an average annual growth of 15.6% per year. 1982 employment by BLS measures was 357,500, an increase of only 3.9% over 1981. Employment growth for the early months of 1983 showed considerable recovery, increasing 9.5% in March 1983 over March 1982 levels.

For purposes of comparison, employment in the manufacture of computing and office equipment March-to March increased 2.1% while employment in the telephone communications industry fell by 6.2%. Employment in Information Services is about 78% of that in the computer and office - equipment manufacturing sector and about 38% of that in the telephone communication sector.

INFORMATION SERVICES INDUSTRY EMPLOYMENT 000 PERSONS AVERAGE ANNUAL



AAGR 1977-1982 = 13.9%

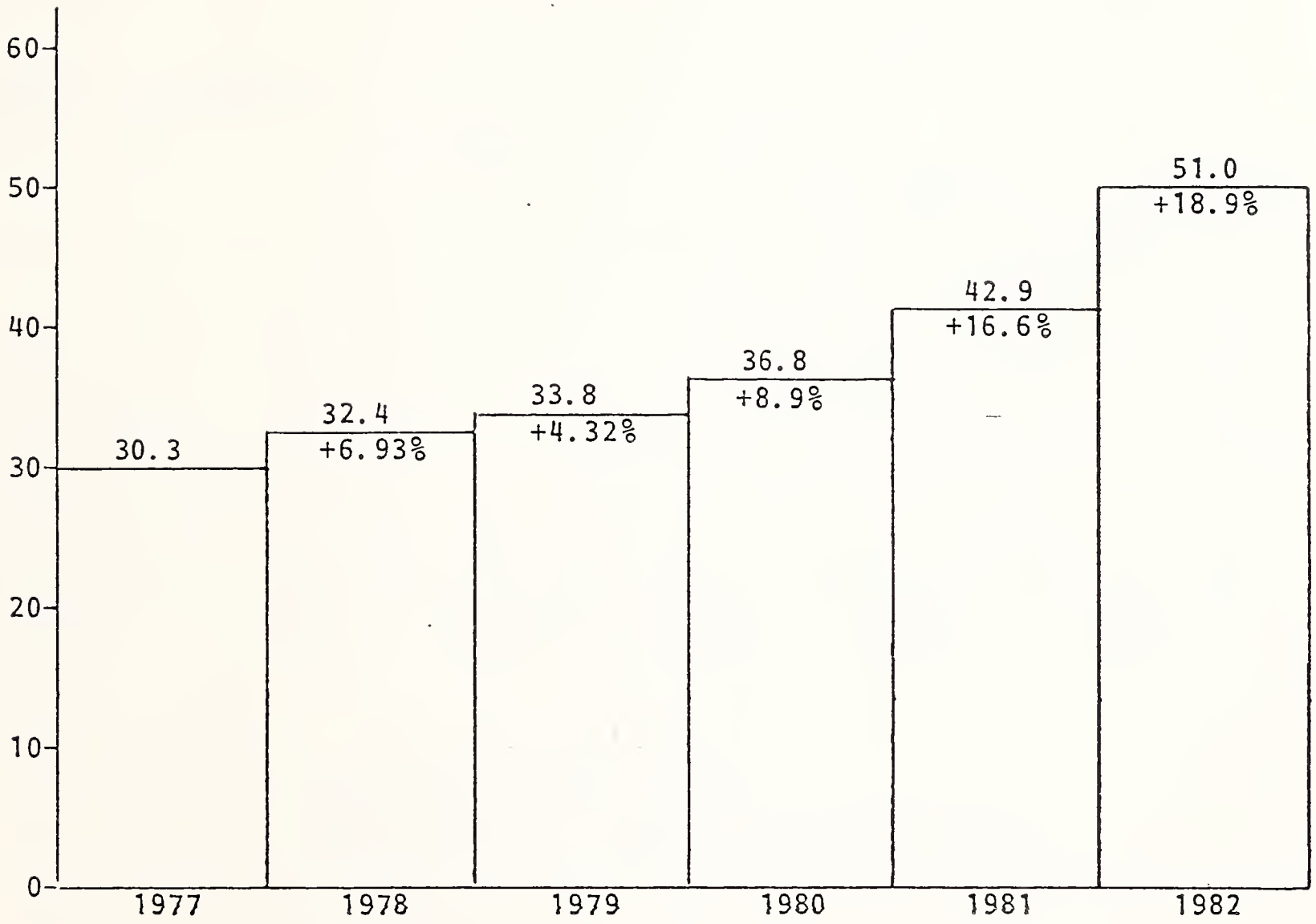
SOURCE: Bureau of Labor Statistics

While this BLS data indicates the large relative size of the Information Services Industry and confirms the industry's economic strength, it should also be mentioned that it probably understates the industry's employment by as many as 100,000 persons. This is due to the method by which data is gathered which may not fully account for persons employed in information services divisions of large firms. As an artifact of method, such persons are counted in the primary Standard Industrial Classification (SIC) code of the parent firm in many, though not all, cases. Despite this limitation on the data, INPUT believes that BLS employment numbers represent a fair proxy for employment growth in the industry.

3. Industry Productivity - Productivity in service industries is acknowledged by most economists as extremely difficult to measure with any degree of precision. Standard productivity measures such as output per man hour in constant dollars are not available for the industry from conventional sources. As a consequence, a relatively crude measure of revenue per employee in current dollars has necessarily been adopted. Current dollars are used since there is no accepted deflator for the industry's output.

By this measure industry output per employee rose from $30,300 in 1977 to $51,000 in 1982 for an average growth of 11% per year. Since this growth is in excess of the average rate of increase in the GNP deflator, we may infer that the industry has probably experienced some increase in real output, typically less than 3% per year. While somewhat better than the general performance of the economy, increases in real output are eclipsed by several industries, most notably telecommunications which has experienced 6-7% annual increases in productivity in a comparable period.

INFORMATION SERVICES INDUSTRY
REVENUE PER EMPLOYEE
$000

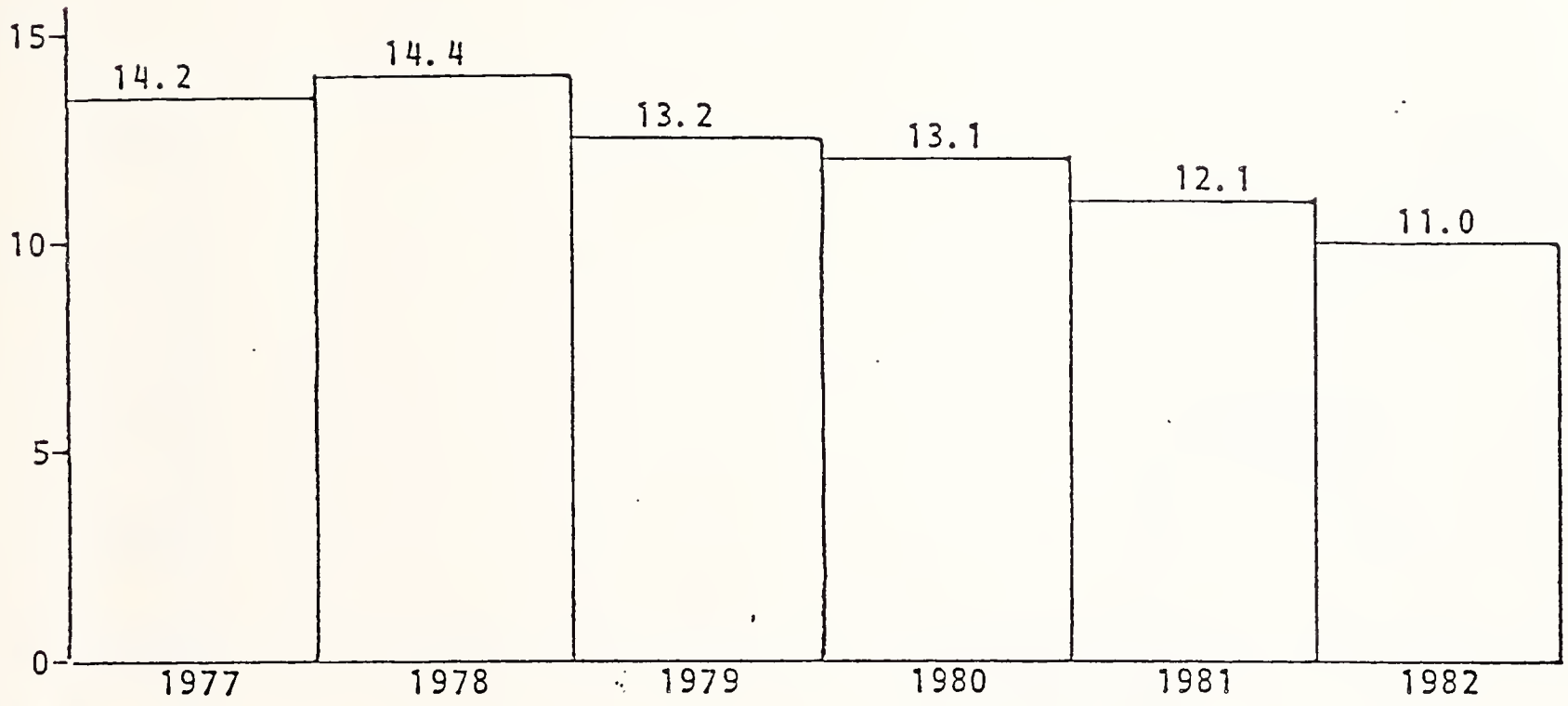


AAGR 1977-1982 = 11.0%

UNIVERSE IS 9 LARGEST PUBLIC FIRMS

SOURCE: INPUT

INFORMATION SERVICES INDUSTRY
PRE-TAX PROFIT MARGIN
(%)



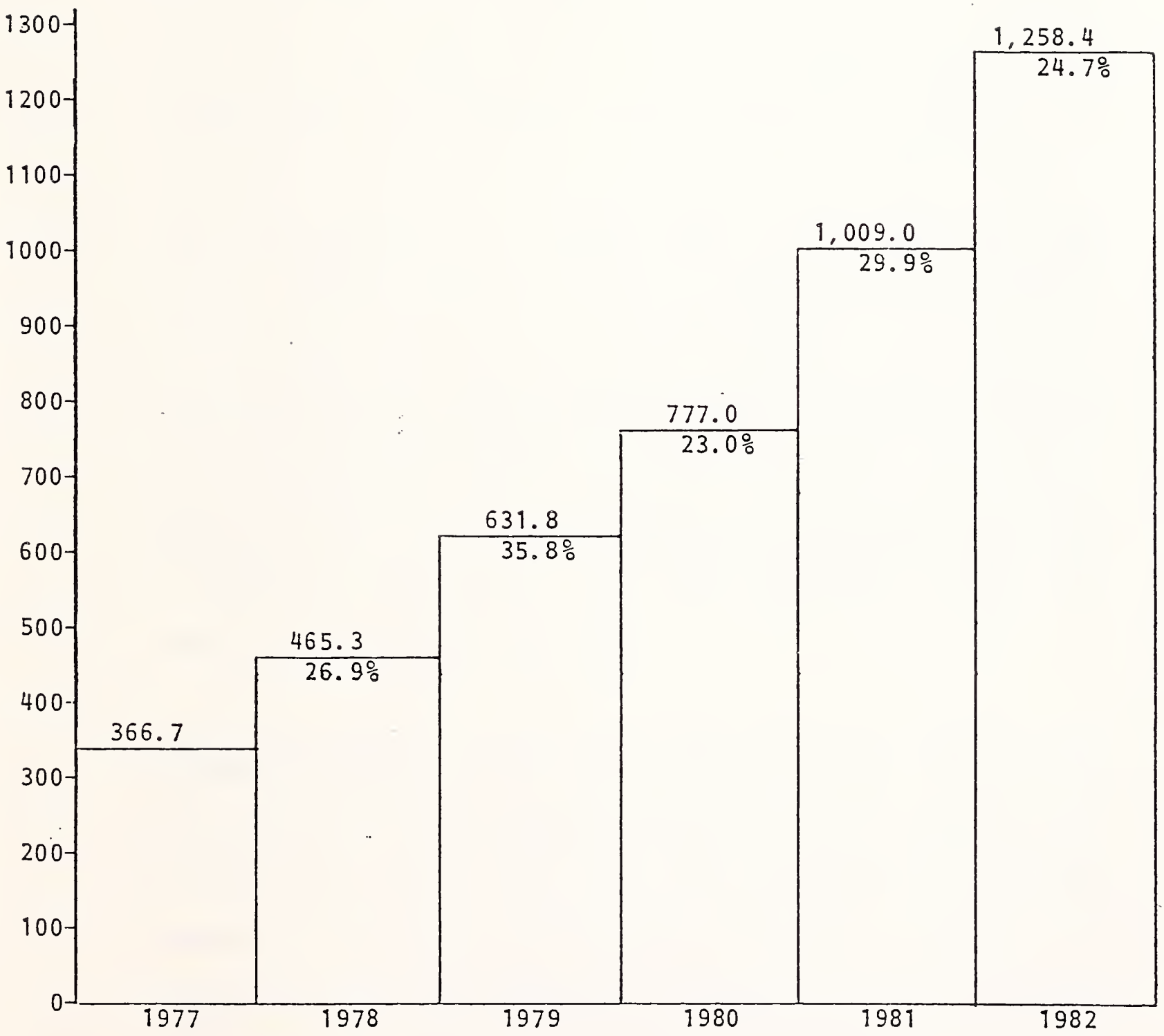
AAGR 1977-1982 = (-5%)

UNIVERSE IS 9 LARGEST PUBLIC FIRMS

NOTE: These firms are somewhat more profitable than smaller firms in the industry. Net margin for these 9 was 6.3% in 1982 vs. an average of 5.9% for 60 firms over $10 MM in 1982 revenue. This phenomenon has persisted over the years.

SOURCE: INPUT

INFORMATION SERVICES INDUSTRY
PLANT AND EQUIPMENT INVESTMENT
$000,000



AAGR 1977-1982 = 28.0%

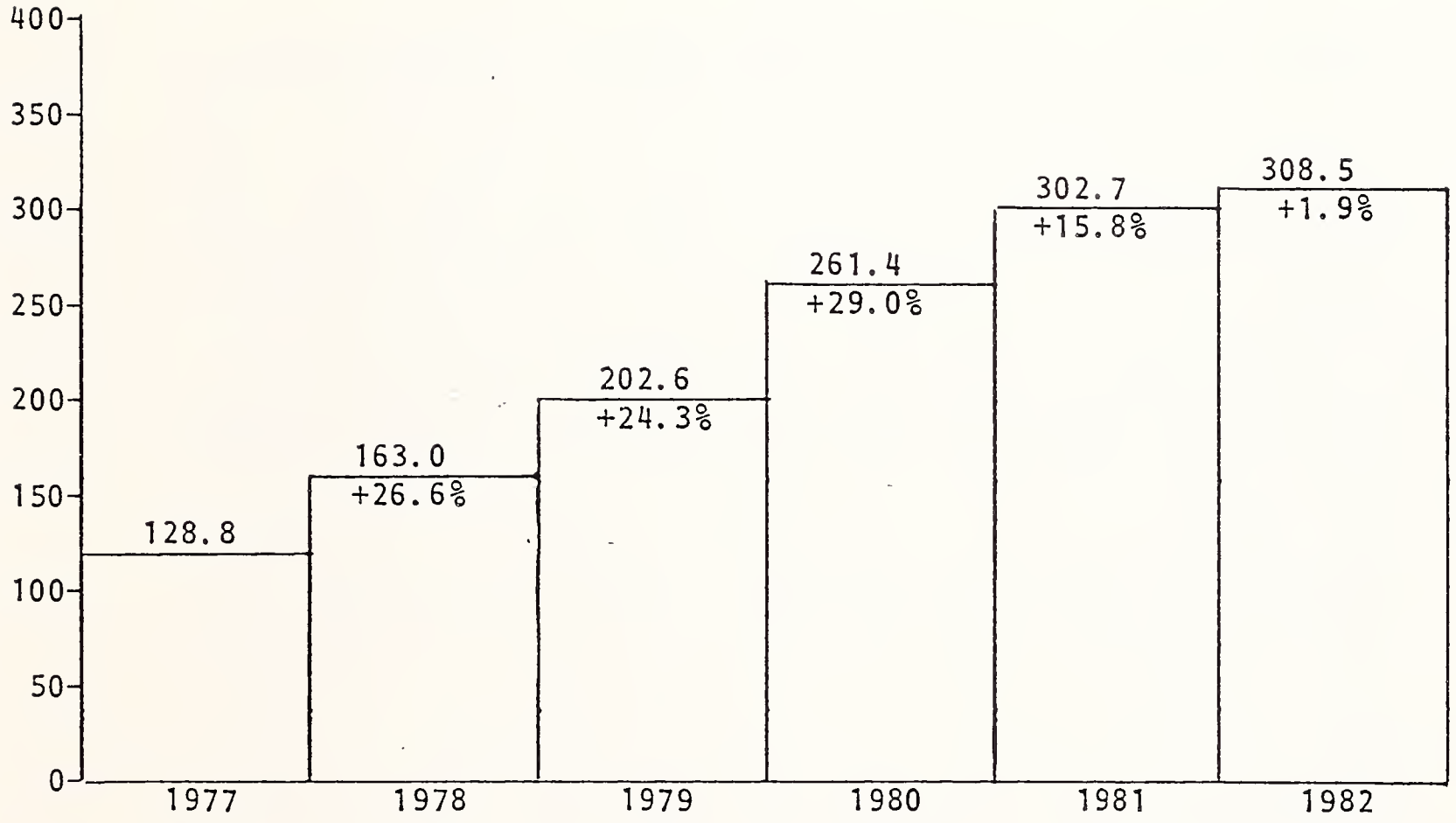
UNIVERSE IS 9 LARGEST PUBLIC FIRMS

SOURCE: INPUT

4. Industry Capital Investment - A key measure of capital investment is plant and equipment investment. This has increased at a rate of 28% per year, faster than either revenue or employment growth. This suggests an increasing investment per employee and increasing capital intensity. While both have, in fact, occurred, relative capitalization measured either as revenue per capital dollar invested or capital per employee have unusual characteristics. For each dollar of invested capital in 1982, the nine largest firms achieved $1.84 in revenues. Capital investment per employee was a very moderate $27,675 for the same companies. By comparison, a group of telephone companies invested nearly 6 times as much per employee while achieving about 1/4 the revenue per dollar invested. Capital per employee was an extraordinarily low $15,789 in 1977 for these same nine companies. At that time they returned in revenue $1.99 for each capital investment dollar. During this same period the net on invested capital has also been in essentially secular decline, falling from 14.24% to 11.8%. This suggests that incremental investments of capital are less efficient than earlier investments; however, the absolute return is still relatively high.

5. Industry Profitability - Pre-tax margins have essentially been in decline for the leading firms in the period 1977-1982. In the 14% range in 1977-78, they had shrunk to 11% in 1982. Net margins have declined less precipitously (from 7.2% in 1977 to 6.3% in 1982) due to reductions in the marginal tax rate of the leading firms. Investment tax credits and other means have been employed to reduce the aggregate tax rate from 49.66% in 1977 to 42.9% in 1982. During this same period net income rose at a 22.2% average rate. The rapid increase in earnings has made the industry very popular with investors, with price/earnings ratios for common shares averaging in the high 20's in July 1983.

INFORMATION SERVICES INDUSTRY
PRE-TAX PROFITS
($000,000)



AAGR 1977-1982 = 19.1%

UNIVERSE IS 9 LARGEST PUBLIC FIRMS

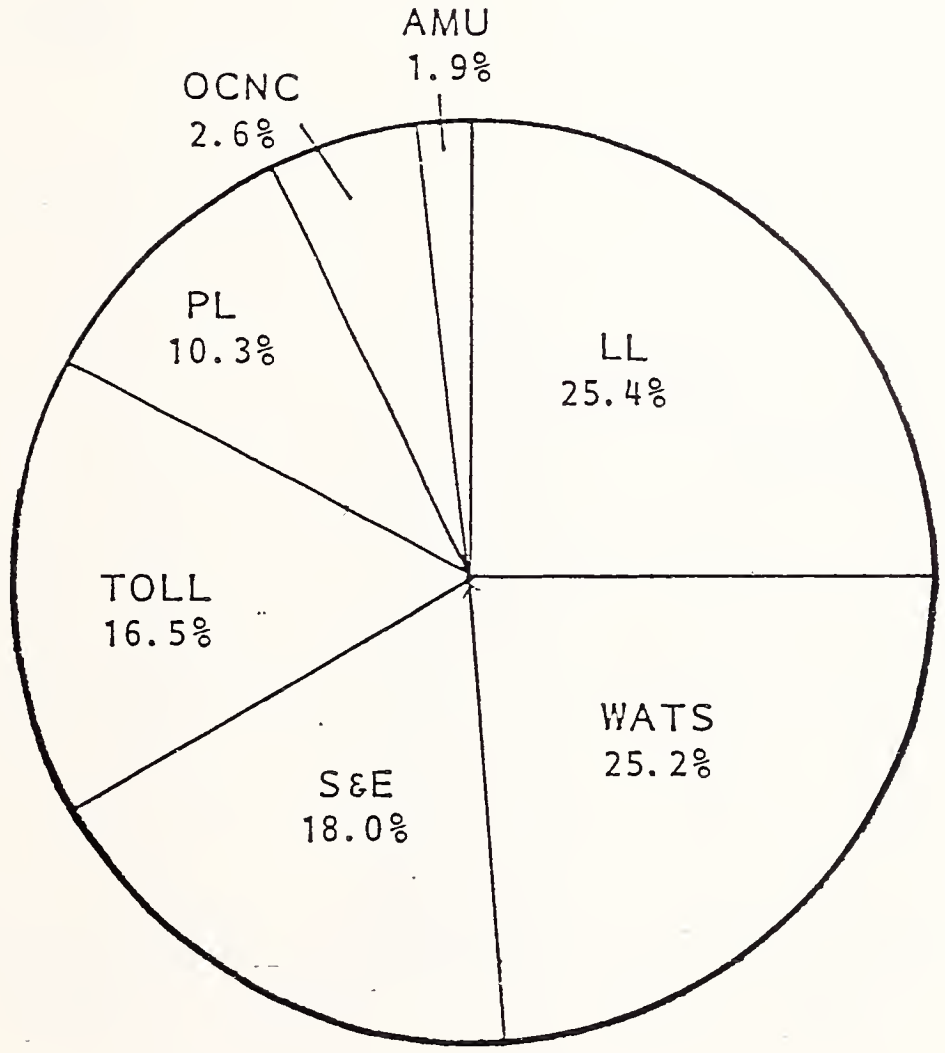
SOURCE: INPUT

6. Industry Telecommunications Revenues - The contribution to AT&T based on AT&T - provided data, the industry's revenue/was found to be approximately $503 Million in 1982, up 26.7% over 1981. The data definition used was MMS revenue data for national and major accounts. The distribution of these revenues by category varied in their growth rates. The slowest growing of the major categories was Service and Equipment, the fastest major category was WATS. Expenditures in these categories grew 16.1% and 41.5% respectively year over year.

It is most significant that Bell system billings by the service companies grew 2.3 times faster than all operating expenses (including Bell). For 9 major firms, operating expenses increased 11.5% during the same period that Bell expenditures in the industry as a whole grew 26.7%. In effect, telecommunications expenditures are becoming a larger portion of operating expenses. Should this trend presist, it is likely that the larger processing service firms will significantly increase their involvement with bypass technology for the local loop and increase their use of satellite transmission. Such firms would also become ideal prospects for the data transmission offerings of Other Common Carriers (OCC's) as these services emerge. Regrettably, time series data were not available to allow the long term trends in telecommunications expenditures to be examined.

This study found that the mean expenditures for Bell System transmission, service and equipment was 4.15% of revenues for nine major firms. These firms accounted for 24.5% of the industry's revenues or about $123 million. Wide variation was found in Bell expenditures. These range from an extraordinary high of 17.5% of revenues to a low of 1.0% of revenue. There are a number of factors which account for this variation. These will be discussed in section V. of this profile.

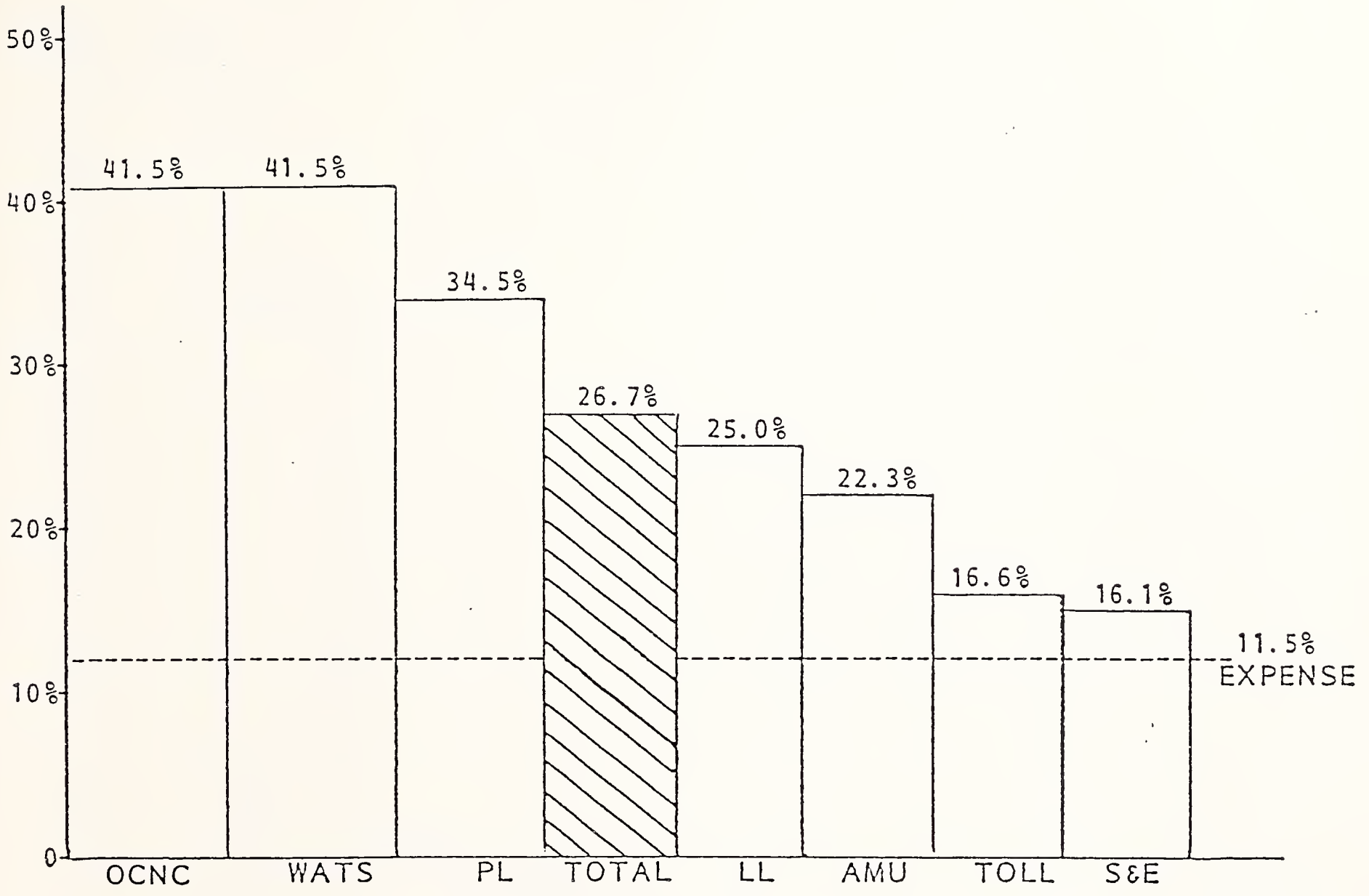
BELL SYSTEM REVENUE DISTRIBUTION
SIC 737 COMPANIES
1982



TOTAL MMS REVENUE = $502,703,490

SOURCE: Bell System

REVENUE CHANGES BY CLASSIFICATION
SIC 737 COMPANIES
1981 VS. 1982



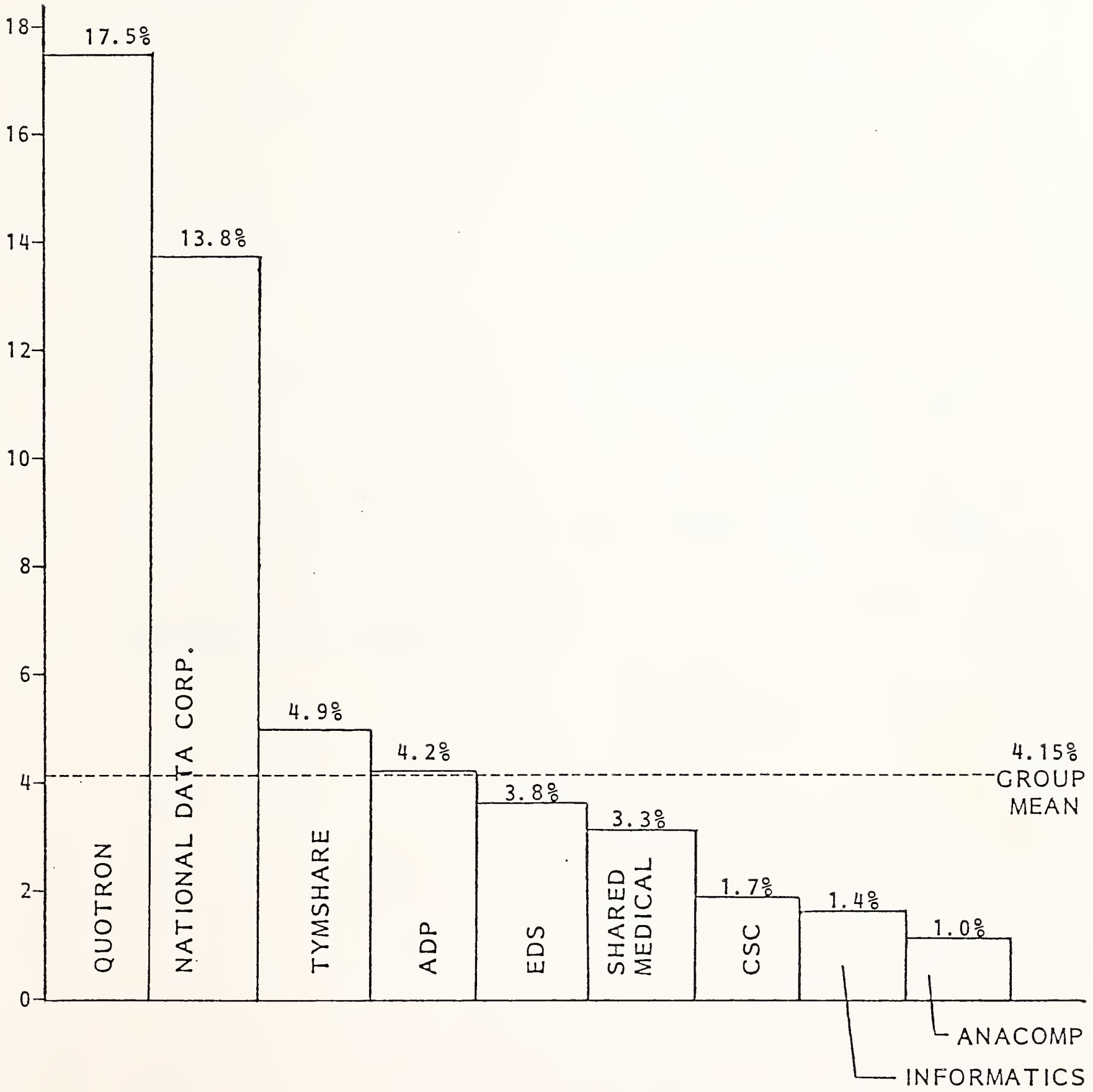
TOTAL, 1981 = $396,674,546

TOTAL, 1982 = $502,703,490

EXPENSE = 81-82 TOTAL OPERATING EXPENSE CHANGE
OF 9 MAJOR FIRMS.

SOURCE: Bell System Data,
INPUT

BELL REVENUE AS A PERCENT OF COMPANY REVENUE
737 COMPANIES
1982

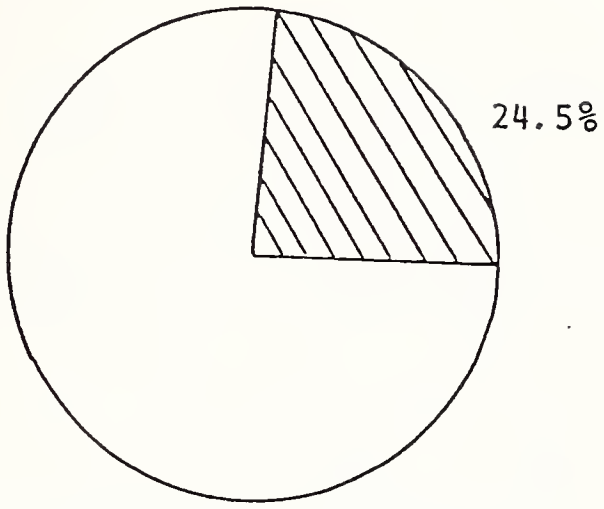


SOURCE: Bell System Data,
INPUT

7. Industry Telecommunications Expenditures Per Employee (Bell) - Telecommunications expenditures per industry employee average $2,240 per employee per year. As in the case of expenditures as a percentage of revenue, wide variation is found. The lowest expenditure among the nine major firms was $670 per year while the highest was in excess of $22,500. This ratio of 33:1 for expenditures seems extraordinarily wide and can be largely explained by the same factors that explain variation as a percent of revenue. In general, transaction processing firms have the highest expenditures, followed by interactive processing while software firms have generally much lower expenditure ratios.

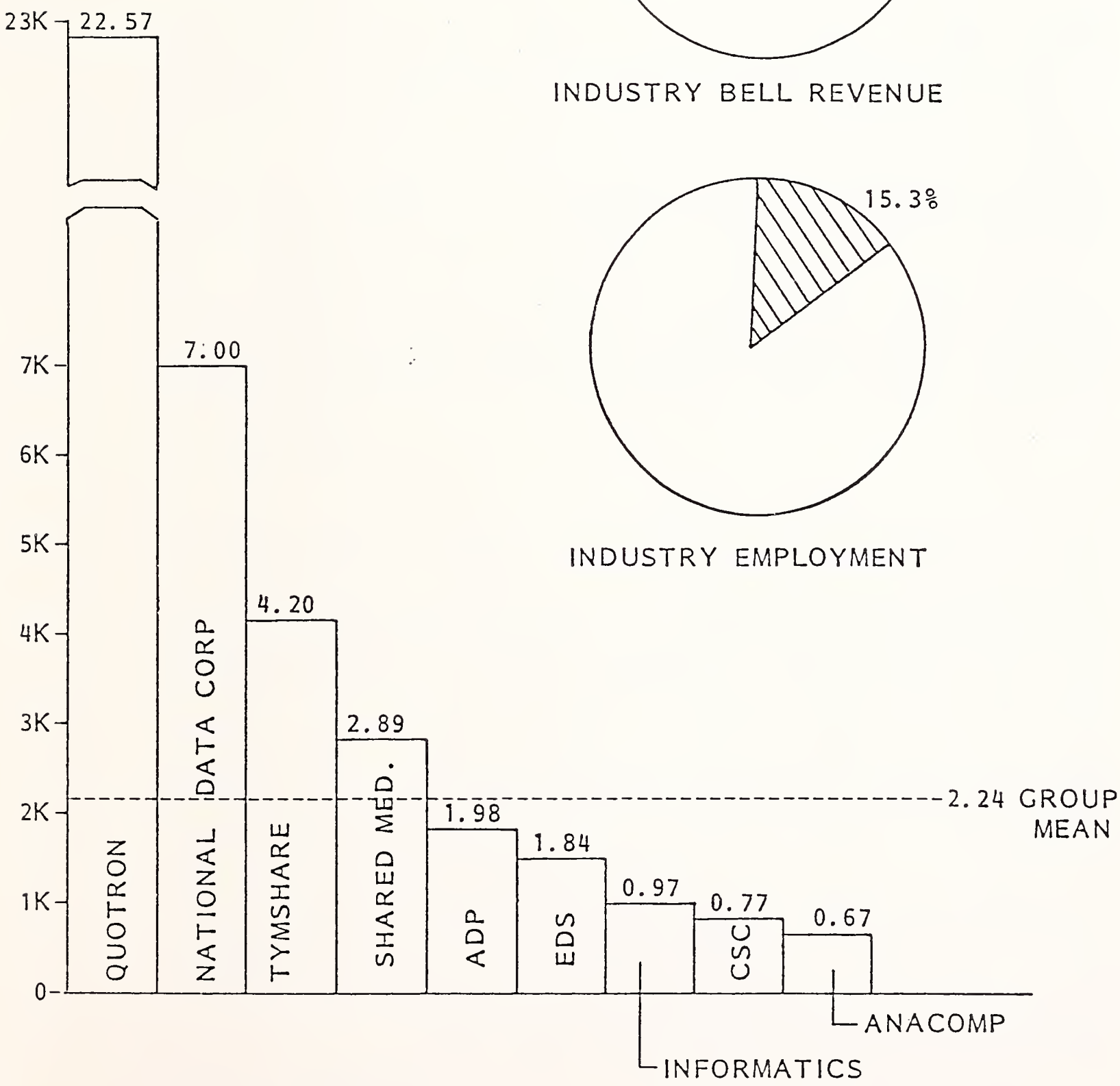
Compared with the three other sectors examined by INPUT, these ratios are very high. When the high telecommunications intensity is considered in combination with the rapid growth in employment and revenues, this industry appars to have the potential to be spending $2-3 billion per year in five years, based on a simple extrapolation of current expenditures and expected industry growth.

BELL REVENUES PER EMPLOYEE
NINE LARGE 737 COMPANIES
1982



INDUSTRY BELL REVENUE

INDUSTRY EMPLOYMENT



SOURCE: Bell System Data, INPUT

B. Secular Trends Summary

1. Economic

Information Services have been characterized by extremely high growth rates throughout the last decade. They have proliferated not only in quantity but type. Conventionally, this is explained by citing an "increasing demand for business information." Since business information is not quantifiable, this explanation is not subject to ordinary proof. Another point usually employed in explanations is that the decreasing cost of computer equipment makes services more popular by reducing their cost. A tertiary factor frequently cited is the "scarcity" of software and the personnel needed to produce it. In essence, this argument points to a massive imbalance between the supply of information processing systems and the demand for these systems or, more properly, the outputs of the systems.

Another argument frequently advanced is that there are "economies of scale" in information processing. In this hypothesis the proposition is advanced that it is less expensive to produce multiple copies of the same software program than to produce multiple programs for the same function, i.e., it is more "efficient" to produce a single accounting program and sell it to multiple users than for each user to produce an individual version of an accounting program. The same argument is frequently extended to processing services. There are a few documentable instances of these "economies of scale" but little indication of their universality.

More likely (but equally conjectural), users of information services may be paying to avoid the complexities of information processing technology either through lack of skill or interest. Essentially, this is an argument for the convenience of service. In addition, some compression of time from identification of need to implementation of system is usually available with services as contrasted to other methods. Occasionally information services have provided genuine technological advantage as in the early days of "timesharing."

In general, there is no single compelling economically-based explanation for the growth of information services, and the impetus to employ such services is subject to wide variations on both an individual firm and market basis.

A key practical realization regarding information services in the recent recession is that they are subject to macro-economic events. This occurred at the firm level beginning in 1980, and the industry continues to show the effects. The impact of recessionary forces was much less evident in the 1974-75 recession, leading many, particularly in the investment community, to advance the view that Information Services were somehow "recession-proof." This proved not to be true in the recession ending late 1982. At the current time there is still some question as to the degree of macro-economic impact as compared to the technological impacts, particularly the rapid proliferation of micro-computers.

3. Technological/Automation - The Information Services Industry is closely linked to technological and automation developments. In general, the industry does not create these developments but is typically an early adopter of them. Improved price/performance mainframe systems, mini-computers and micro-processors are among the technologies adopted early by the industry. While the industry does not typically drive hardware innovation, it is frequently the source of software innovation. Multi-user operating systems, relational database management systems, financial modelling languages and large public databases are among the industry's innovations which are now being adapted to other information processing sectors. Relatively easy-to-use information systems are another result of the industry, an essential feature if a system is to have wide-spread use beyond the relatively small number of individuals with substantial technical skill. Despite its emphasis on technology, it is notable that the industry has not achieved rapid gains in productivity. In this regard it is much more like traditional service businesses such as accounting and advertising than it is to "high technology" manufacturing businesses.

4. Regulatory - In the main, the Information Services Industry has escaped direct regulation although there was some concern during the FCC's Computer Inquiries I and II that portions of the industry would be brought under regulatory purvey. From time-to-time issues such as data privacy, trans-border data flow and some copyright questions have brought the industry into the regulatory, judicial and Congressional arenas. In the main, the industry may be characterized as adverse to regulation.

The sole exception to this was Tymshare, a processing services company, which pioneered in the area of Value Added Networks (VAN's). The company tariffed its offering and actually sought continuing regulation when the FCC "deregulated" these carriers. From a technological standpoint any of several timesharing companies could have brought forth a functionally identical offering to Tymshare's but were largely unwilling to assume the "risk" of regulation of a part of their business. A number of such companies have now brought forth "VAN" services after deregulation.

While the firms in this industry are not directly regulated, regulatory actions in the communications sector may have substantial impact on their operations due to the high degree of dependence some of these firms have on telecommunications for the delivery of their services. FCC-mandated access charges, for example, are considered a absolutely critical issue by many in the industry at the time of this writing (7/83).

C. Positions of Leading Companies

1. Descriptions of leading firms. Firms selected for description in this section have the following characteristics:

- Have revenues in excess of $100 Million, large for the industry
- Are publicly held companies
- Are characterized by rapid growth historically
- Have a dominant position in at least one industry sector
- Are referenced elesewhere in the document

The nine firms account for approximately 10% of the industry's 1982 revenues. Descriptions of individual firms follow.

2. Relative Strengths

Information on relative strengths in particular markets is contained within the descriptions.

3. Communications - intensive product and services.

In general, the Information Services Industry may be considered as communications-intensive. Specific areas show above-average concentration. Prime among these are processing services of two types: interactive processing, exemplified by the "timesharing" companies, and inquiry or transaction processing as typified by stock quote services.

Interactive services, as a market, are several times (perhaps five) larger than inquiry services. The combined market for these services was $5.8 Billion in 1982.

Leading processing companies are typically operators of extensive and highly sophisticated data communications networks oriented toward low speed (asynchronous) terminals. Network capacities at the largest are numbered in the thousands of access ports. Currently terminal speeds are about 60% 30 CPS and 40% 120 CPS with a strong tendency to move to the higher speed. This is likely to have an upward impact on network capacity requirements.

An additional factor creating more extensive use of voice services is the geographic dispersion of major firms. Most processing companies maintain a considerable number of sales offices. Requirements for communication with headquarters organizations from the relatively small offices (averaging perhaps $3-5 million per location) create heavy use of MTS and WATS services.

4. Competitive intersections with AT&T transmission services. In a very modest sense, some firms in this industry intersect competitively. These intersections are principally in the area of data communications. It was mentioned earlier that many processing services firms operate extensive networks to deliver their services. It is now very much a trend to "spin-off" these networks to create what are in essence VAN networks in the Tymshare/Telenet fashion, i.e., low speed asynchronous terminal nets. The market position occupied (from a user perspective) is that of a supplementary service for low density communications to sites without sufficient traffic to justify private line installation.

In addition to Tymnet/Tymshare, several other firms have announced similar capabilities. These include General Electric Information Services, Automatic Data Processing and Compuserve, as well as United Computing Services (Uninet). While there are functional and technical differences between these offerings, they address essentially the same market. It is expected that still other firms will announce "network" offerings in the near future. Typically these networks offer terminal to mainframe interconnections, error detection and protocol conversion of a limited nature. Such offerings exist in a grey area somewhere between data transmission and information processing. Early sales of the networks are frequently to existing processing service customers, and occasional linkages are made between processors as well, although this is typically done at relatively low speeds, e.g., 9.6 KB.

Should the market (currently about $200 million) support these new offerings, it is likely that these vendors will expand the range of speeds and protocols supported, possibly bringing them into a more closely competitive relationship with present or future AT&T services.

Since considerable networking expertise exists in many service companies, it is possible that they will be among the earlier adopters of new technology. Tymshare and United have obtained DTS authorizations, some exploration of the CATV area is occurring and Compuserve is experimenting with satellite transmission. These projects, if successful, could widen the competitive intersection in the future.

Movement into voice services by these companies is considered unlikely.

D. Long-term Telecommunications Potential

The Information Services Industry is characterized by extremely rapid growth in revenues and employment, as well as a high degree of telecommunications intensity. It appears, therefore, to have excellent potential for both voice and data services.

The relatively high degree of sophistication present among many network operators in the industry suggests that they would be ready adopters of new service which meet their needs. Since many operators perform extensive analysis on their networks and do not regard them as "overhead," rational appeals on both a technical and cost basis should find acceptance.

Off-setting these positives is the ability of many firms to configure data networks using OCC and VAN offerings. It is believed that cost sensitivity is high among members of this industry. Most firms in the industry are already users of OCC and VAN services. Use of resale services is uncalibrated but probably not extensive.

Because these networks produce revenue for their operators, reliability is a paramount consideration. The perceived absence of "end-to-end" service in the post-divestiture environment will cause many firms in this industry to increase their network maintenance staffs. To some extent this may reduce their dependence on AT&T services.

III. INDUSTRY OVERVIEW

A. Fundamental Industry Functions

The Computer Services industry provides an astonishing array of product and service functions. In general most firms in the industry provide a portfolio of services, as opposed to a single service. This is due to two factors:

- Most market/segments are not of sufficient depth to support firms of large size ($100 million +) based on a single offering.

- Boundaries between markets are extremely permeable and little capital is required to offer services in multiple markets.

Industry analysis in Computer Services generally takes two forms:

- Categorization by industry served

- Categorization by nature of service

For most firms in the industry some form of "specialization" is employed using a combination of these categories. For example, a firm might "specialize" in "processing services to automobile dealers." This particular market orientation results in vast numbers of firms addressing combinations of markets, usually referred to as niches.

Seven broad categories of service are generally recognized. These are:

- Batch Processing Services
- Remote Computing Services
- Processing Facilities Management
- Systems Software
- Applications Software
- Professional Services
- Integrated Systems

Definitions of these categories will be found in Appendix I. Given the current industry forecast growth rate of 24% per year 1982-1987, the processing services will generally grow somewhat more slowly, while the software sectors will grow much more rapidly, albeit from a smaller base.

On an industry basis the largest sector is Banking/Finance at $4.341 Billion in 1982. This is closely followed by the Discrete Manufacturing sector at $4.16 Billion in expenditures. The third largest sector is the Federal Government at $2.803 Billion, or about 2/3 the size of the banking and finance sector. The fourth largest sector is Process Manufacturing at $2.658 Billion. At 42% of the largest is Insurance with $1.819 Billion in 1982 expenditures.

There are also modest differences in growth rates between the leading sectors although all major sectors are expected to grow in the mid-20% range in the period 1982-1987.

INFORMATION SERVICES - TOTAL MARKET FORECAST
BY INDUSTRY SECTOR, 1982 - 1987

INDUSTRY SECTOR	USER EXPENDITURES FORECAST								
	1981 ($M)	81-82 GROWTH (%)	1982 ($M)	1983 ($M)	1984 ($M)	1985 ($M)	1986 ($M)	1987 ($M)	AASR 82-87 (%)
DISCRETE MANUFACTURING	3514	18	4160	5028	6374	8300	10958	14544	28
PROCESS MANUFACTURING	2212	20	2658	3269	4121	5265	6737	8604	26
TRANSPORTATION	590	15	677	804	1005	1292	1674	2187	26
UTILITIES	805	15	928	1081	1293	1557	1889	2301	20
BANKING/FINANCE	3697	17	4341	5217	6456	8083	10185	12946	24
INSURANCE	1554	17	1819	2189	2731	3423	4286	5391	24
MEDICAL	1090	21	1321	1625	2043	2590	3290	4211	26
EDUCATION	377	7	404	445	506	591	686	803	15
RETAIL DISTRIBUTION	1227	14	1396	1611	1960	2410	3000	3781	22
WHOLESALE DISTRIBUTION	1146	17	1346	1601	1972	2456	3081	3910	24
FEDERAL GOVERNMENT	2460	14	2803	3246	3847	4611	5608	6777	19
STATE/LOCAL GOVERNMENT	1339	7	1433	1566	1758	2031	2360	2738	14
SERVICES	1314	16	1525	1825	2204	2690	3310	4078	22
OTHER	1008	10	1110	1283	1514	1807	2186	2649	19
TOTAL	22330	16	25920	30790	37790	47110	59250	74920	24

NOTE: Grand totals are rounded to nearest $10 million; therefore columns may not total exactly.
Growth rates are rounded to nearest 1%.

PROCESSING SERVICES

While growth rates do not vary materially by industry, they vary quite substantially by type of service. As indicated, processing services are growing more slowly than software services. Within these two broad categories there are also substantial variations with respect to both size and growth rate.

The Remote Computing Services are both the largest category of processing services and the second fastest growing. At $5.7 Billion in 1982, this sector is expected to grow to $12.4 Billion in 1987, equivalent to 17% per year growth.

Batch Services, at $4.2 billion, are relatively slow growing and expected to expand to $6.6 Billion in 1987 for a 9% average annual growth rate. Payroll processing, mail order list processing and tax processing, as well as some specialized scientific services such as the seismic data processing used in oil exploration are the main components of this service class.

Processing Facilities Management - the operation of a client's DP function under a long term contract - is expected to grow at 18% per year from $1.5 Billion in 1982 to $3.5 Billion in 1987. Growing interest in this type of service by the Federal Government could result in this sector growing much more rapidly.

A final, related category is that of Integrated Systems. Extremely rapid growth is expected in this area, which is sometimes known as Turn-key Systems. In this service mode the vendor supplies the customer with a combination of equipment, software and maintenance to accomplish some specific task. The largest area of this processing mode is "CAD/CAM" or Computer Automated Design/Computer Automated Manufacturing.

INFORMATION SERVICES MARKET
FORECAST, 1982-1987

CATEGORY SERVICE	MARKET SIZE 1982 ($ billions)	GROWTH RATE (%) IN THE YEAR					MARKET SIZE 1987 ($ billions)
		1983	1984	1985	1986	1987	
Batch Processing Services	$ 4.2	11%	10%	10%	9%	8%	$ 6.6
Remote Computing Services	5.7	13	16	17	19	19	12.4
Processing Facilities Management	1.5	17	17	18	18	18	3.5
Systems Software	2.6	32	36	37	36	35	11.7
Applications Software	2.9	37	43	40	41	41	15.9
Professional Services	5.5	13	16	19	20	21	12.5
Integrated Systems	3.5	22	29	32	31	31	12.4
TOTAL INDUSTRY	$25.9	19%	23%	25%	26%	26%	$74.9

NOTE: Each market has been rounded to nearest $0.1 billion, therefore markets may not total precisely.

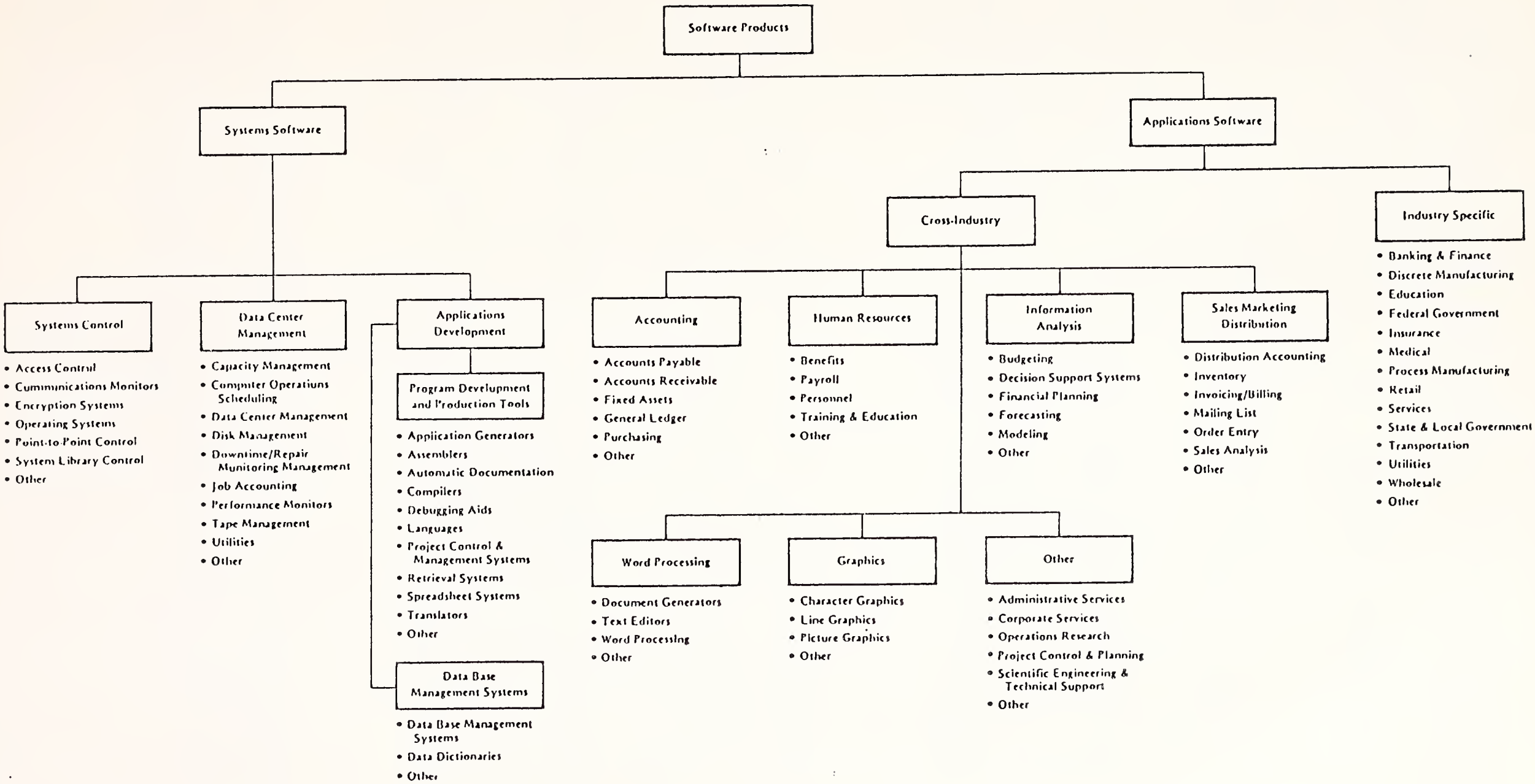
The overall Integrated Systems market was $3.5 billion in 1982 and is forecast to grow to $12.7 Billion in 1987 for an impressive 29% average growth. The CAD/CAM sector was $0.9 Billion in 1982 and is expected to explode to $3.4 Billion in 1987, equivalent to a 30% growth rate. Almost all Integrated Systems sold are of an industry-specialized nature, and the sector is also served by manufacturers of computer hardware.

As with any rapidly growing business area, participants are numerous and diverse. Particularly strong growth is expected from new entrants currently configuring highly specialized systems based on micro-computer technology. By the nature of this business, it may be entered from any of several positions: hardware manufacturer, software provider or processing service. Each of these types of "players" has one portion of the three-part offering. As a result, this market segment will be particularly hotly contested.

SOFTWARE

The software products marketplace is extremely complex with few firms of the thousands participating having revenues in excess of $50 million per year. An attached exhibit shows the basic structure of the market beyond the two basic categories of Systems Software and Applications Software. In general, software firms are less communications-intensive than processing service firms which often rely on large networks. Software is usually delivered on magnetic media through physical transport of the tape or disk.

SOFTWARE PRODUCTS MARKET STRUCTURE

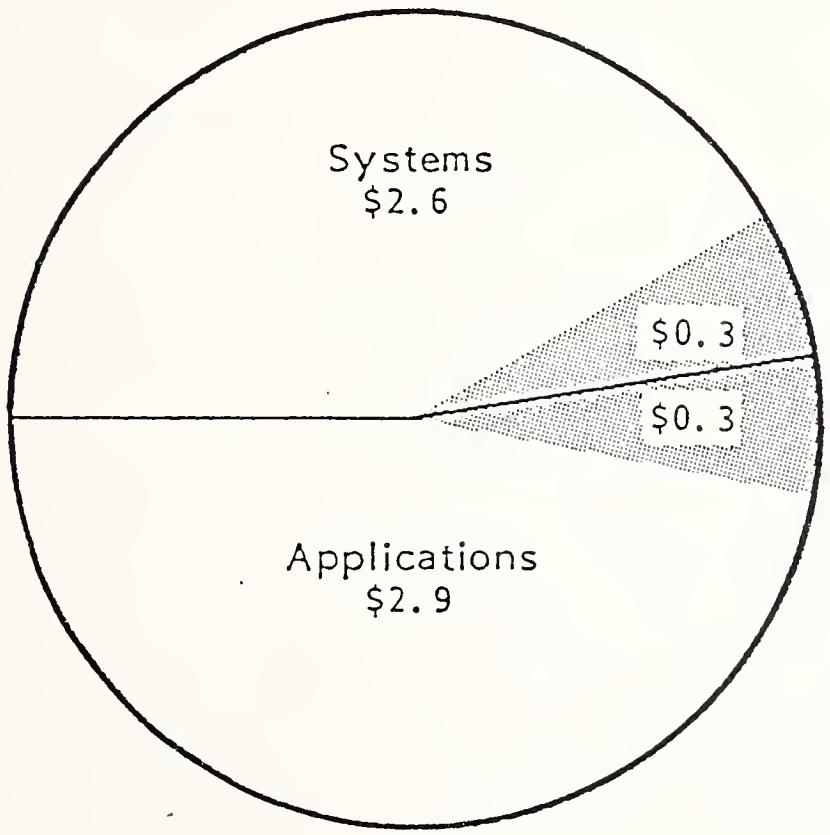


Systems Software -which includes operating systems, communications monitors and applications generators- was a $2.6 Billion segment in 1982. Forecast to grow at a 35% average rate, it will reach $11.7 Billion by 1987. Applications software, slightly larger, with $2.9 Billion in 1982 revenues will grow at 40% average annual rate to reach $15.9 Billion in 1987. Applications software encompasses what are often referred to as "packages" for accounting, human resources, budgeting, sales and a number of other "cross industry" applications. An additional major category -59% of the segment's revenues- come from industry-specific applications targeted to do a special task in a designated industry. Portfolio management in banking and educational software for schools are example of this type. Industry specific software is expected to grow at a slightly faster rate of 43% as contrasted to cross-industry growth of 39%.

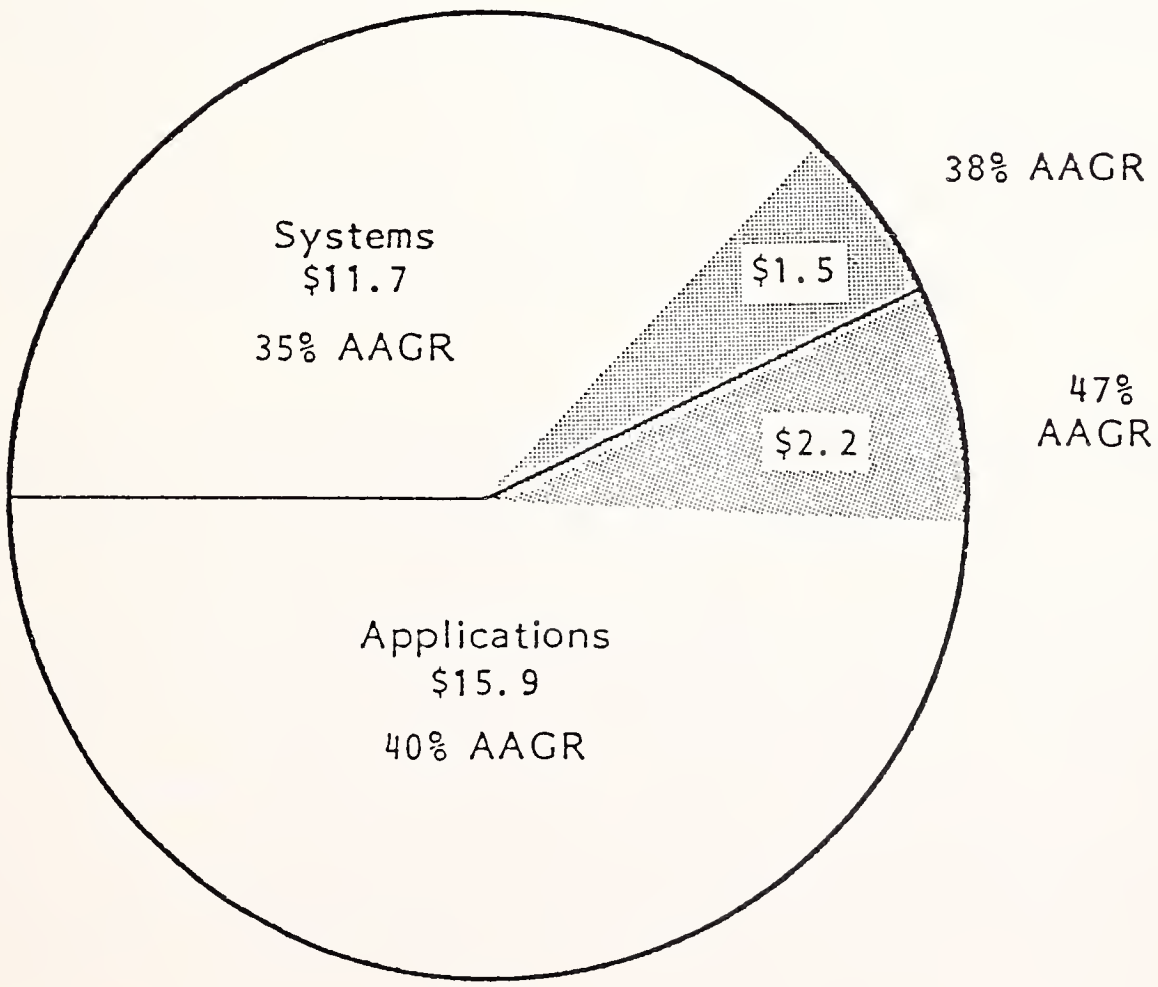
Additionally, software is distinguished by the size of the processor on which it is intended to run. Software for micro-processor-based personal computers is experiencing explosive growth with this sub-segment expected to grow at an astonishing 47% per year in the applications area and 38% in systems software. This subsegment is currently being exploited by literally thousands of individuals and hundreds of miniscule firms and might properly be described as chaotic. Current 1982 revenues for personal computer software were approximately $600 million compared to virtually zero five years ago. Video game software is excluded from this estimate.

On an industry basis, the largest consumption of software is to be found among Discrete Manufacturing Firms, estimated at $1.136 Billion in 1982. At $801 Million or 70% of the leading sector is Banking and Finance.

SYSTEMS VERSUS APPLICATIONS
SOFTWARE PRODUCTS GROWTH



1982
$5.5 Billion



Personal Computer

1987
$27.5 Billion
38% AAGR

The third largest software sector is Insurance with 1982 expenditures of $611 million, followed closely by Process Manufacturing at $594 million and the Federal Government at $435 million. Industry forecast growth rates are somewhat more variegated than in processing services and range from 33-40% among these industries.

2. Related Service Descriptions

Computer Services, particularly processing services, are closely and competitively related to other services. The prime competitive service is the in-house information processing system. Many processing services are perceived -correctly or incorrectly- by users as fungible with in-house alternatives. At this competitive intersection processing services directly intersect the manufacturers of computer hardware (of which they are also prime customers) and also face competition from others in their own industry, i.e., software vendors and turn-key systems suppliers. In effect users are confronted with a hierarchy of alternative solutions and suppliers all attempting to meet the same need: solution of an information problem. It may be said that processing services require the least technical skill and the largest expenditure on the part of the user while the purchase of a hardware and software offering from independent sources represents the least expenditure and the maximum skill.

It is also worth noting that another form of competition to most computer services is manual processing of information, particularly in the payroll and accounting areas. In these areas subtle competitive intersections exist between accountants and service firms. Often forgotten is the fact that vast majority of business units are still unautomated. In effect these establishments have chosen to employ labor instead of automated methods. While it is an article of faith that most businesses will someday have automated information functions, this frequently made assertion is substantially undocumented.

3. Related Industries

There are a number of industries which are related in one sense or another to the Computer Services Industry. Key among these are:

a. Banking which in many cases derives revenue from automated services to other banks or computer services such as payroll and accounting in competition with free-standing service companies. Citibank and BankAmerica are two banks which have significant computer service revenues.

The role of banks in providing computer services has been challenged by a major trade association, ADAPSO, before various bank regulatory agencies and in the courts. In an action involving Citibank, ADAPSO contended that the presence of banks in the marketplace had chilling effect on competition, constituted risky deployment of bank assets and was cross-subsidized by other banking activities. The ADAPSO position which sought to limit the role of banks in the marketplace was defeated in the courts in late 1982. ADAPSO is likely to address this issue again (even though defeated in the case of the Citibank complaint) and may seek to influence legislation regarding bank participation in the industry. In reality, the record of banks as competitors in the services industry is uneven, at best, with most banks losing money on computer services which are known as "customer services" within the banking industry.

b. Accounting Firms are becoming increasingly active in the Computer Services area. A natural linkage occurs through both the audit and consulting functions of these firms to both large and small clients. Accounting firms are now moving out of a purely advisory role and are engaging in active recommendations of software packages to clients. They have, therefore, become a factor in the market for software and are "selling" packages either written by the firm or designed to its specifications. There is some concern, particularly outside the accounting community, that such practices may be abusive of professional relationships. This issue is unlikely to become a serious inhibitor of the accounting/computer services "tie-in" in the near future.

c. Computer Manufacturing has several significant relationships to the Computer Services industry. Primary among these is the fact that many manufacturers of equipment also participate in some facet of the industry. IBM, for example, participates through the sale of software packages (revenues in excess of $1 Billion per year) and through the provision of Remote Computing Services through its Information Network group which is expected to achieve $250 million in revenues within four years.

In addition to direct participation, innovation in systems built by manufacturers strongly influence the economics of the industry since equipment is basic to the service provided. Rapid declines in processing cost and the development of ever - smaller systems have resulted in a proliferation of processing services and alternative delivery mechanisms combining, for example, large mainframe systems with micro-computers. This current trend in processing services changes the nature of service offerings with respect to both price and capability.

Additionally, there is direct competition between methods of solving problems, basically along the lines of in-house versus services, as described earlier. Historically, this competition has resulted in improved services, both with respect to price and quality. Within the last two years there is a growing belief that developments in micro-processors may have outrun the improvement in services and that micro-processor-based systems may assume a number of tasks formerly performed on Remote Computing Services. This may result in reduced growth for the RCS industry. Similar fears expressed regarding previous mini-computer technology did not come to fruition. Since the micro-processor phenomenon is still in a very early stage, it is not yet possible to forecast the ultimate outcome.

d. Major Industrial Firms often play a significant role in the industry through the ownership of Information Services Industry subsidiaries. General Electric, McDonnell Douglas and Boeing are among the firms which have significant positions. The three firms mentioned account for about $1 Billion in service revenues. With the greatly increased awareness of this industry which has occurred in the last few years, it is likely that other firms with massive data processing capabilities will create such subsidiaries.

e. Telecommunications firms also play a significant role in the industry, not only as providers of transmission services, but as purveyors of computing services. GTE, Continental and United are among the major independents providing services. GTE and Continental revenues are currently most modest --less than $200 million combined-- but United has a significant position in both Remote Computing Services and Software with revenues in the vicinity of $250 million. It is expected that telecommunications firms will become increasingly active in the market after the divestiture. It is known, for example, that several of the Divested Operating Companies are actively pursuing the development of computer services while major independents are investigating further large commitments, perhaps through acquisition.

4. Industry Revenue Forecasts and Analysis

For clarity of exposition, revenue forecasts have been combined with earlier segments in this Industry Overview.

B. Structure

1. Size Concentration

a. Sales

The Computer Services industry is noted for its lack of concentration. The largest independent firm, Automatic Data Processing, accounted for $558 million revenues in 1981 or 2.53% of the industry's total. Number one in service revenues was IBM with $985 million, and in second position was Control Data with $661 million.

The top five firms accounted for about 14% or $3.2 Billion of the industry's revenue. The top ten firms achieved 20.2% of industry revenue with the top 20 capturing 26.3% of non-captive United States revenues.

A total of 243 firms achieved 1981 revenues of $10 million or more out of a total estimated industry participation of more than 6000 firms. A listing of the 243 firms is included.

As can be seen, the industry is not very heavily concentrated, particularly in comparison to other, more mature industries such as banking where concentration is much higher. An exhibit shows the market share of firms over $10 million in revenue.

It will be noted that concentration varies by industry sector. The most concentrated by this measure is Professional Services with 65% of revenues flowing to over $10 Million firms. The least concentrated are Integrated Systems suppliers where 45% of 1981 revenue is captured by $10 Million-and-up firms. Also exhibiting lower concentration is Software Products at 49% while the very large ($10.06 Billion) processing services sector exhibits 60% concentration by this measure.

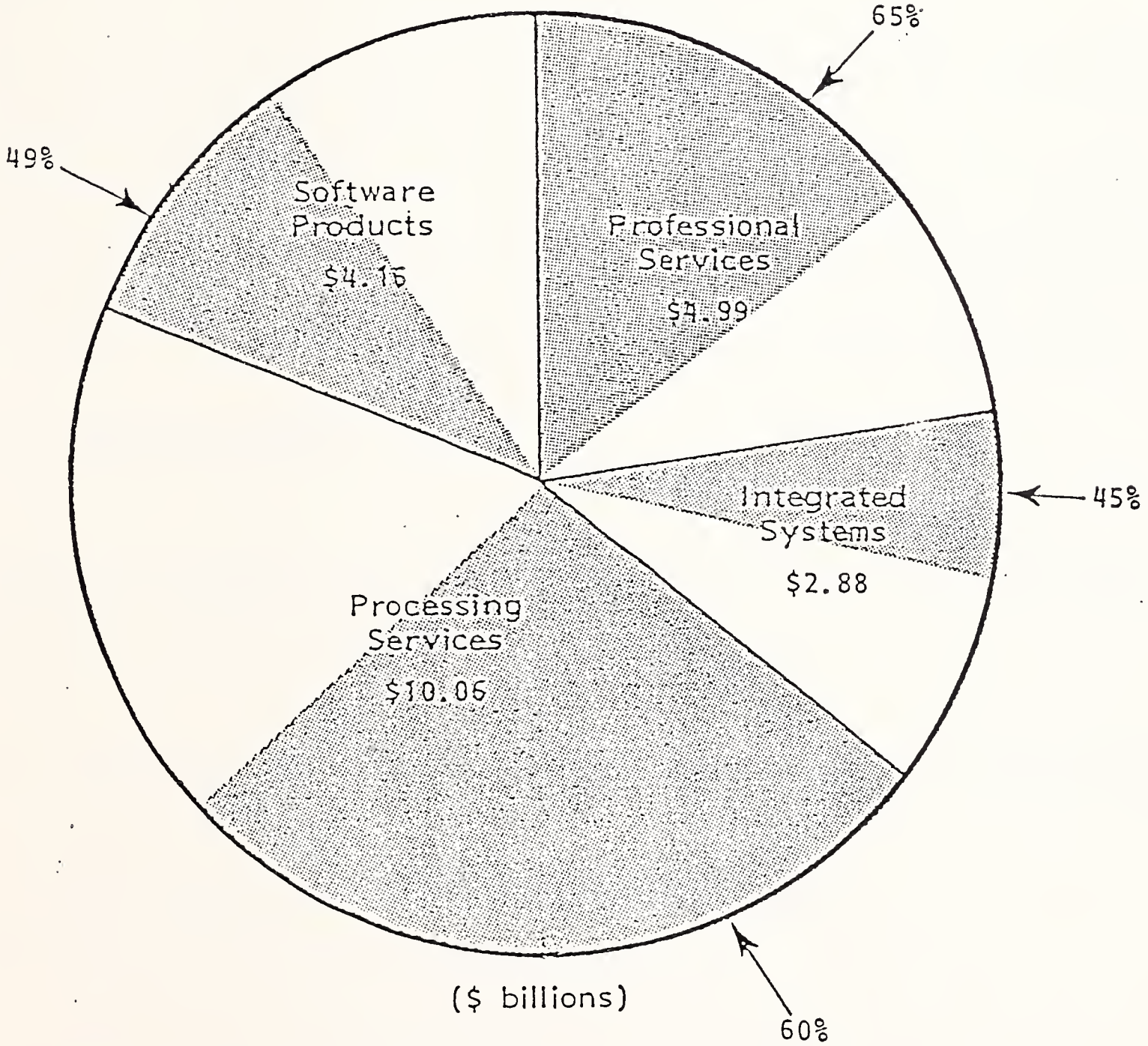
We may conclude that the absence of concentration -- and a related paucity of market power in an economic sense is characteristic of the Information Services Industry. Likewise, no firm has a share of total market in excess of 4.5%.

b. Assets

Uniform data on the assets of computer services firms are not mentioned by any source, public, quasi-public or private. Despite the absence of industry-wide data, certain generalizations about the asset structure of successful firms may be made.

Most notably, service companies tend to be cash flow generators and are typically able to fund operations from cashflow without resort to significant quantities of debt financing. One measure of asset concentration is capital per employee. In 1981, 48 publicly held computer service firms with revenues in excess of $10 Million per year had an average capital investment per employee of $28,100. By comparison the equivalent ratio for 75 telephone companies was $114,800. Likewise, the telephone companies generated approximately $0.50 in revenue per dollar of investment as compared to the service companies revenue of about $3.00 per dollar of invested capital. These ratios confirm the absence of asset intensity in the industry. In general, processing services firms tend to have much higher asset concentrations than do software companies, many of whose assets are primarily "off the balance sheet" in the form of personnel.

COMPUTER SERVICES INDUSTRY
BY SERVICE MODE,
1981



Market share of companies over $10 million.

c. Share

Major indicators of market share are elaborated in part a. of this section.

2. Geographic Concentration

Unlike other "technology industries" such as semi-conductors and computer manufacturing, the service industry exhibits no meaningful geographic concentration. No specific area of the country is significantly "overweighted" with regard to service availability. This is due to the existence of numerous "field offices" of the major firms and the existence of minor firms in all major SMSA's. In the main, the patterns of service availability conforms to the general patterns of business concentration.

3. Merger & Acquisition Trends

Mergers and Acquisitions play a key strategic and economic role in the industry. Mergers are typically undertaken for the principal purpose of:

- Enhancing market position through the acquisition of a firm providing services complementary to the acquiror
- Reducing risk associated with new product development
- Diversifying the portfolio of the acquiring firm
- Obtaining technological expertise
- Extending geographic coverage

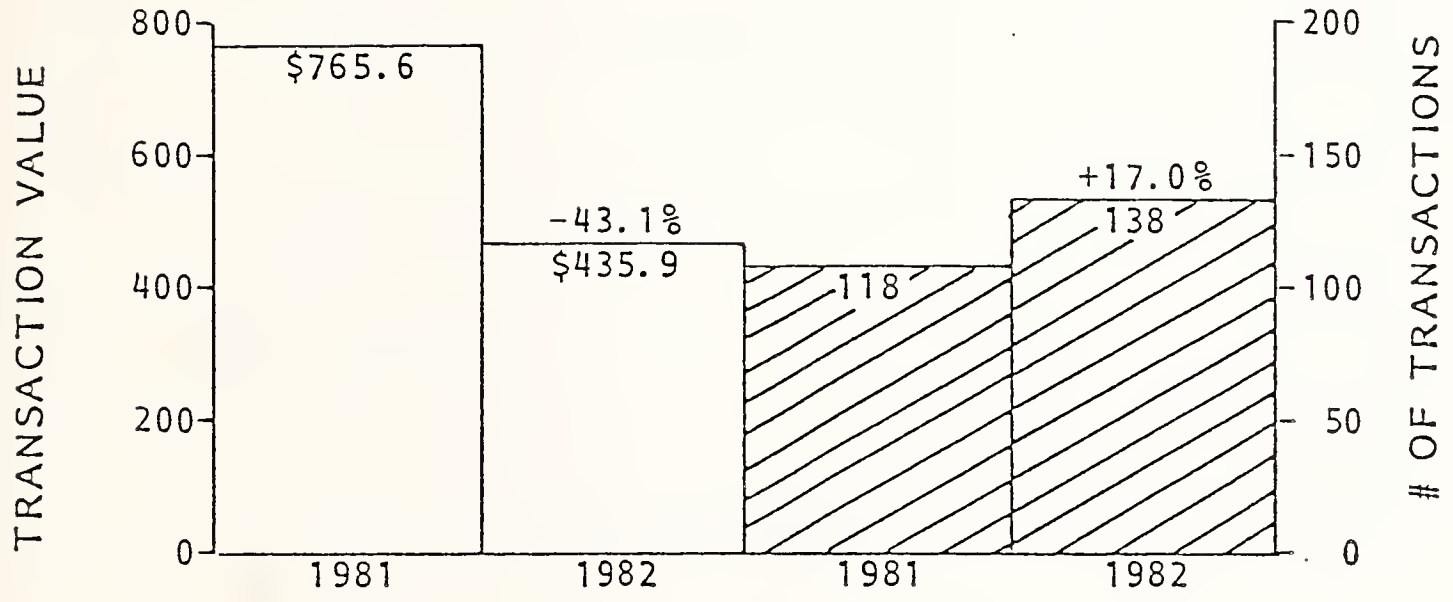
These motives apply primarily to acquisitions within the industry, i.e., by firms in the industry acquiring other firms in the industry. There is also a distinct pattern of acquisitions by large firms outside the industry. These tend to be "buy-ins" by firms attracted to the services industry's superior growth rates and rates of return.

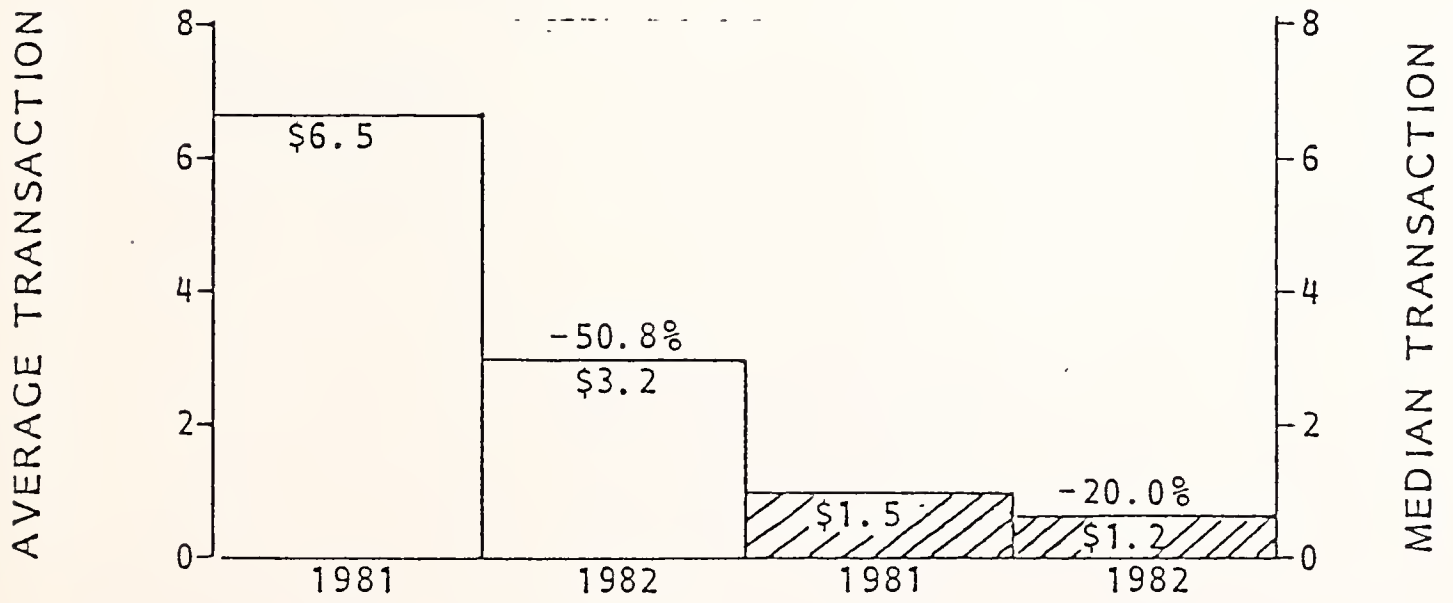
Acquisition activity is affected by overall business conditions and particularly the condition of the public equity markets. During up-market periods there is a tendency for smaller firms who might otherwise be acquisition candidates to make public offerings as an alternative method of realizing "latent" capital gains.

The strong public offering market and somewhat depressed general business conditions during 1982 resulted in a reduction of acquisition activity compared to 1981 for the industry. Value of transactions consummated during calendar 1982 was $435.9 Million, down 43% from 1981. The average transaction size fell 51% to $3.2 Million while the number of transactions gained 17% to 138 from 1981's 118. The rise in the number of transactions was due in large measure to the 25 (twenty-five) transactions of Control Data Corporation, idiosyncratically high number for any single firm. CDC's activities accounted for about 18% of the number of 1982 acquisitions.

Unlike the well-publicized acquisition activity of major industrial firms with transactions in the hundreds of millions, 1982's largest acquisition in the services industry was the $52.5 million acquisition of Agency Records Control by Fireman's Fund Insurance. Five 1982 acquisitions were made in the $20 million range, and the tenth largest was $9.7 million. Only one of the top ten companies acquired was publicly held. The acquisition of STSC by Continental Telecom was made at a 57% premium over the public share price. At the time of the buy STSC was an unprofitable timesharing company with only modest growth. Firms in this industry currently command substantial multiples as the STSC example shows.

INFORMATION SERVICES
MERGERS & ACQUISITIONS
1981 VS. 1982
($000,000)





SOURCE: Broadview Assoc.

MAJOR EMPLOYMENT CATEGORIES
INFORMATION SERVICES
(SIC 7372 ONLY)
1978

Professional and Technical	39.4%
Computer Specialists	28.6
All Other	10.8
Managers, Officials	12.5
Sales Workers	2.3
Secretaries, Etc.	33.9
Office Machine Operators	21.7
All Others	7.2
Crafts and Kindred	9.3
Machine Repairers	8.1
All Others	1.2
Operatives	1.9
All Others	2.6
	100.0

White Collar = 88.8%

Blue Collar = 11.2%

Source: BLS

4. Employment

Employment data for the industry is presented in section II. A. 2, along with a graph displaying growth over the last five years. The caution is once again made that due to technical factors this bureau of Labor Statistics data probably understates employment in the industry.

5. Employment Categories

The Information Services Industry is overwhelmingly white collar with 88.8% of total employment so designated by the BLS. This is considered to be true for the industry as a whole. Note particularly that computer specialists made up 28.6% of the industry's employment in 1978 versus an incidence in the total workforce for all industries of 0.46%. This is an indication of the relatively high technological content of the industry.

The percentage of managers and officials is also somewhat higher, though by no means to as extreme a degree. Managers constitute 12.5% of the industry's workforce compared to 10.7% for all industries.

According to BLS analysis of the shape of the industry's employment in 1990, no significant modifications are forecast to occur.

6. Employment Expense

Aggregate data for the industry is not tracked by any known source on a current basis. Wages of production and non-supervisory personnel are tracked by the BLS. These show the wage rate for the industry at $8.43/hour in January 1983 exceeds that of the wage rate for the total labor force by 12%. Average wage of all non - supervisory workers was $7.54 in January 1983. By comparison the wage rate in the Telephone Communications Industry was $10.38. In the years 1977 to 1982 these wages increased an average of 10.5% per year versus 8.3% for all workers. Telecomm worker wages increased 9.4% in this period.

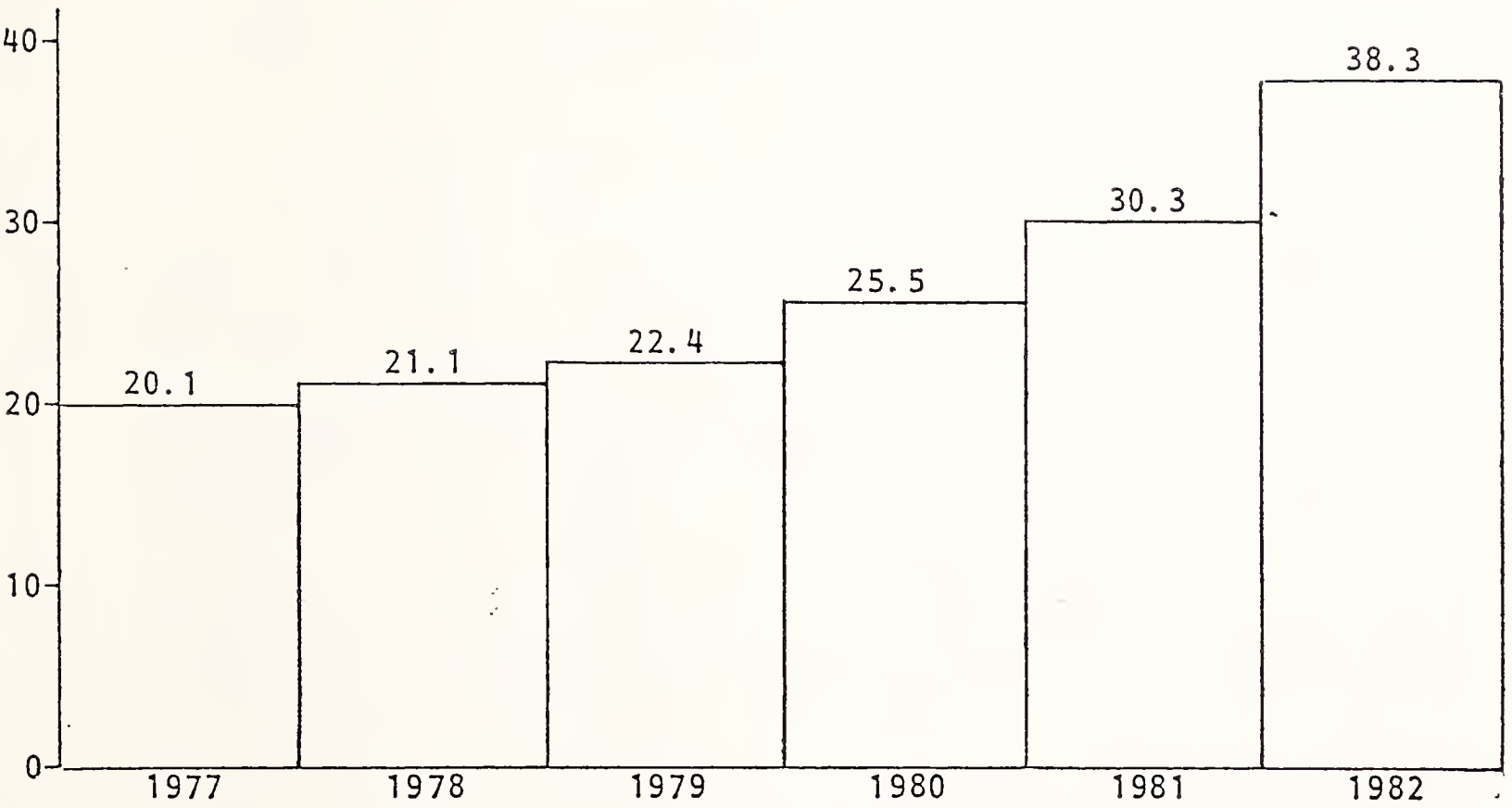
Because of the rapid growth of the industry and the nature of the majority of its employment, interpretation of these data should be most cautious. It would appear, however, that the rapid growth of the industry is able to support above-average increases in compensation.

C. Industry Financial Parameters

1. Industry Capital Structure - Additional discussion of these points occurs in section II.A. and II. B. In 1982 the nine major firms used as a proxy for the industry obtained 63% of total capitalization in the form of equity and approximately 19% in the form of long-term debt. There have been no material changes in this basic structure for several years. Net sales in 1982 averages 7 times working capital, up from 6 times working capital in 1981. Net income as a proportion of working capital shows no distinct trend and has remained in the 40-50% range for several years. Because of investor attraction to this industry, long-term debt is relatively low. Companies employ equity offerings to obtain capital when required. These remarks apply to publicly held firms. Very little is known about the capital structure of private firms, save that they rely on cash flow and retained earnings to finance expansion. Venture capital has also proven to be easily available for credible start-ups and second-round financing.

2. Cash Flow - Computer services businesses have long been regarded as "cash cows." To the extent this is true, it is primarily characteristic of services with only moderate development requirements. There is a school of thought in the industry that believes that some major processing firms "starved" investment in new systems and services, thereby showing cash surpluses that might have been more profitably invested. This school of thought holds that certain firms currently experiencing difficulty (e.g., CSC Infonet and Comshare) were particularly "guilty" of this practice. As a practical matter, cash flow has remained in the range of 11.5% of revenues for the nine proxy companies for the last five years.

INFORMATION SERVICES INDUSTRY
TOTAL ASSETS PER EMPLOYEE
$000



UNIVERSE IS 9 LARGEST PUBLIC FIRMS
REPRESENTING 15.4% OF INDUSTRY EMPLOYMENT,
TOTAL 1982 ASSETS OF $2.1 BILLION AND
REVENUES OF $2.8 BILLION

SOURCE: INPUT

3. Return on Investment - ROI has been in secular deline for the last five years as discussed in section II in II. A. 4. The reasons for this decline are not clear.

4. Margins - Profit margins are also discussed in section II. A. 5. Generally speaking the Information Services Industry is considered to be a highly profitable one. In reality, average margins have been in decline for several years at the proxy firms. This decline can also be seen in the more recent (1981-1982) results of a much larger sample of 90 public firms. This group is instructive to examine because it exhibits the characteristics variations in margin which typify the industry's sectors. It will be noted that the highest margins pretax and as a group occur in Software Products at 18.3%. This is followed at some distance by processing services at 13.2% pretax. Integrated Systems companies rank a close third with 12.9% while Professional Services are a distant fourth with only 5.7% pretax return on sales. The quarter-to-quarter earnings stability of processing firms is greater than that of other sectors. It is not known if this is a function of the generally larger firms found in this sector or is indigenous to the nature of the business. Professional Services have traditionally been a low-margin business due to labor intensity and dependence on highly paid programming professionals to create custom programs on a one-off basis. It is believed that the lack of a "multiplier" on custom software is key to the low profitability.

6. Taxation - There are no material taxation issues at present. From time-to-time states have attempted to impose sales tax on information services. Most of these attempts have been defeated and the issue is not current.

In other regards the industry is not differentially affected by any known tax initiatives.

7. Cost Structure - The absence of aggregate labor data makes determination of the industry's cost structure exceedingly difficult. Further, there are substantial variations by service sector as shown in the above section on margins. Interest expense comprised a miniscule 1% of revenues among the nine proxy firms in 1982, while advertising was even lower at 0.2%. In terms of major expense classifications, a break-down is attached for the Remote Computing Services (RCS) subsector of the processing service comanies for 1981, the most recent data available. This break-down is synthesized from reports on six companies.

8. Macro-economic Effects - The Information Services Industry exhibits some sensitivity to recession, but the effects are a function of industry sector. In general, Processing Services were most affected by the recession ending late 1982 with growth in this sector attenuated to 11% from the historical rate in the high teens. Likewise Professional Services experienced a decline to about 11% from the typical 17% range. Other software services boomed through the recession at growth rates in the 40% range. These were driven in part by the rapid growth in microcomputer utilization.

RCS EXPENSE PROFILE

	TYPICAL
G&A	12.9%
OPERATIONS	27.7%
DATA COMMUNICATIONS	10.8%
R&D	8.1%
SALES	31.2%
MARKETING	9.3%
	100.0%

6 LARGE COMPANIES SYNTHESIS

Recession-stricken sectors responded by reduced hiring, substantially reduced company growth rates and, in some cases such as Tymshare and CSC, multiple loss quarters. Integrated Systems services were also impacted with purchases of the dominant CAD/CAM systems reduced as manufacturing firms cut capital equipment budgets.

It is worth noting, however, that these recession-induced events were extremely modest, at least compared to those experienced by many manufacturing industries. As the industry grows as a percentage of GNP, it is likely that it will experience increasingly strong recessionary effects. This is clear from comparing the 1974-75 recession performance when the industry was much smaller ($5.6 Billion) to the 1982 recession.

Other than recession-related phenomena, the industry exhibits no other known cyclical responses. Real output in a conventional sense is not measured; data on current dollar revenue per employee, a surrogate for productivity, is presented in section II. A.3.

10. Ratios of Leading Firms. Please see the appendix.

D. Technology and Automation

1. R&D Expenditures - Research and Development expenditures in the Information Services Industry typically range from 2% to 6% of revenues. When cited for firms in the industry, the number usually refers to the development of software. Because of Financial Accounting Standards Board (FASB) requirements, industry firms are not permitted to capitalize software development but must, instead, expense development in the year that it occurs. Further there are acute problems in the valuation of software, the distinguishability of new development as contrasted to software enhancement and difficulty in determining what software activity constitutes maintenance of existing systems. As a result, any statement as to R&D expenditures in the industry should be considered in light of the substantial ambiguities surrounding the appropriate definition of R&D.

An innovative approach to the development of major software systems has been developed by Anacomp. Since 1980 this firms has been forming limited partnerships with investors to fund the development of software. The investors receive tax benefits and the possibility of substantial returns on their investment. Anacomp has come under strong criticism from the financial community and certain of its stockholders for practices surrounding the use of limited partnerships. This is due primarily to the firm's practice of allowing investment in the partnerships by its officers.

This practice is perceived by some to constitute an inappropriate, less than arm's length relationship. Investors in the partnerships may also be impacted if the IRS should determine that investors were not "at risk." Other use of partnerships to finance software development was made by National CSS, an RCS firm, in 1978-79 for the development of operating systems software.

2. Innovation Propensity - The Information Services Industry may properly be considered to be highly innovative with respect to the technology employed and continuous development of marketing practices. Technological innovation is primarily found in the software of both processing service firms and in the software firms themselves. Among the developments are large financial and economic databases, value-added networks, electronic mail, interactive operating systems, financial modelling languages, Critical Path Method systems, time series statistical analysis, database management systems and the creation of a large number of industry-specific applications packages, including a large number for the telecommunicatons industry. Remote Computing Service firms are also pioneered in the application of mini-computers in the control, routing and error correction functions of data networks and were the earliest commercial adopters of packet switching.

Many firms are now involved in the application of micro-computers to data networks and in hybrid combinations of local and mainframe processing. Distributed networks with intelligence and processing capability in multiple nodes have also been employed by the industry. In general, this innovation -when successful- has resulted in new functional capabilities and/or cost reductions in services.

In the past three years the locus of innovation has shifted to the microprocessor arena and most particularly to software for these devices. While the level of activity may be considered intense, the actual quality of much of the software developed leaves much to be desired from the perspectives of ease-of-use, functional capability, compatibility and documentation. It is expected that improvements will be made in these areas as the sector matures. At present, there is an avalanche of product of uncertain quality and considerable confusion among users.

3. Data Processing Intensity - This sector is, by definition, data processing-intense. With respect to internal operation, ther is no evidence that major firms achieve unusual operating efficiencies as a result of their expertise and computing resources.

4. Innovation Incentives/Disincentives

a. Competition

Competition in the industry has relatively unusual characteristics. Chief among these is that most firms do not compete "head-to-head" due to the tendency for larger firms to possess a "portfolio" of services. Accordingly, most firms see different sets of competitors depending on the market for a specific service. In many cases a firm's overall size has little influence on its competitiveness in a specific market. This is due to the fact that no firm has a dominant share of any market.

In addition to competition between firms in the industry, there is frequently competition between types of solutions to information problems. This means that in a specific case (from the end-user's perspective) the purchase or lease of a computer system may prove to be a viable alternative to the use of an information service. There is, therefore, competition between industries for what might be called "information expenditures."

The competitive picture shifts constantly as market participants alter the quality and costs of their offerings. To some extent an over-riding competitive factor is the announcement and availability of improved software packages and less expensive processors. This tends to reduce the competitiveness of the processing services sector.

b. Deregulation - The primary effect of deregulation on the industry is indirect but potentially significant. The deregulation of banking and telecommunications may result in the further entry of new competitors into the industry with bases in these industries. To date, entries from these sources have not been particularly successful. If, however, the management of these large firms musters a long-term commitment to information services, then it is possible that these firms will have a significant impact on the industry. Since industry growth is so rapid, it is unlikely that they will seize material share within the forecast period, i.e., before 1987. Information services have unique strategic and tactical requirements which are of considerable subtlety and not easily learned by methods other than experience. Most notable among these is that the size of the parent firm or its capital commitment bear no direct realtionship to success historically.

It is expected, therefore, that the entry of recently de-regulated firms into the market will have little adverse impact on the current participants. It can be assumed, however, that individual firms and trade associations will use whatever means are available in the courts and with the regulatory agencies to impede entries to the extent possible. It should also be noted that such efforts have not been very successful in the past.

c. Process Costs

1. Labor Expenses in certain classes of industry employment tend to be high. This is particularly true in programming, communications and sales operations. While wages are a component in this higher cost structure (but as a proportion, not "worse" than other services businesses) an often-overlooked factor is the mobility of personnel which results in very high turnover. While this effect lessened in the most recent recession, it was persistent in the decade prior to it and will likely re-occur with the recovery.

It is not unusual for firms in the industry to experience 25% annual turnover rates. The effect of these rates is to increase recruitment and training costs with the problem compounded by the labor requirements of growth. In some companies there have been periods where salesforce turnover has reached the 50% per year level with predictable effects on sales productivity. In most firms, this phenomenon tends to be decried but accepted as inevitable. As a "hidden" cost of labor its effects on industry profits may be substantial, but no solution to employee mobility has been found to be universally effective.

2. Energy - These costs are not a material factor in the Information Services industry since it is not a heavy user of energy.

3. Plant - We have previously noted the lack of heavy capital requirements in the industry. It is further worth noting that many firms make extensive use of rental property. This is possible because the majority of space has no particular requirements beyond that of ordinary office space. While it is true that certain computer equipment has environmental conditioning demands, these can be met with modifications to ordinary space. Heavy floor loadings, unique layouts, environmental controls, transportation access or other considerations common in manufacturing businesses are almost entirely absent in the Information Services Industry. This permits the use of rental property or low-cost company-owned buildings.

4. Offshore Operations - The nature of the industry is such that little use can be made of low-cost offshore labor in the manner of electronics manufacturing. Some firms market their services offshore, typically in highly developed European nations and, among some software companies, elesewhere around the world. In most cases "international" business is a relatively small portion of total revenues but one which is difficult to ascertain with precision due to a variety of joint venture, partial ownership structures, the use of holding companies and the vagaries of accounting conventions. In any case, it is estimated that the revenues of international operations account for less than 10% of the revenues of the nine proxy firms.

5. Sources of Critical Technology - In essence, Information Services are driven by the developments of the computer manufacturing industry. As systems with increased price-performance are released, the industry adopts these systems for use in processing services or creates software products to run on them. Innovations in processors such as mini-computers and, more recently, micro-computers have not only spawned new firms to take advantage of market opportunities but have occasionally stimulated the development of whole new industry sectors such as Integrated Systems and Micro-Processor Software.

6. Long Term Effects of Technology - The long term effect of this continuous flow of new processing technology is to stimulate ever-wider use of information systems. A peculiar characteristic of the industry is the slow to non-existent rate of obsolesence for certain types of services. Batch payroll and accounting services are an excellent example. Forecast to be obsoleted for more than a decade, these services remain a viable business and one which exhibits growth rates under competent management that are quite acceptable, i.e., in the low double digits. It is apparently true that certain technologies are so appropriate for specific tasks that they are unlikely to be supplanted, despite a generally high velocity of change in the industry as a whole.

Micro-processors and mini-computers created many new services and future systems will likely have the same effect. A very significant bottleneck is the development of software for these processors. Occasionally retarding the growth of new services is the entrenched position and investment of firms in older technology; but this is largely over-rated as an impediment because of the absence of substantial market power among even the largest firms. If large firms do not develop new systems using contemporary technology (when there is legitimate benefit), they may be assured that another, smaller firm will.

7. Plant Obsolescence - This is not a material factor in the industry in the sense that it is in certain large manufacturing industries. The rate of technological change and the relatively low capital requirements of the industry tend to permit "graceful" updates of equipment. It is, however, sometimes asserted that certain of the processing service firms have "milked" their earlier investments and are now stranded outside the technological mainstream. There is no compelling proof of this hypothesis. The counter-argument is that software and service are the essence of the industry and that hardware age or type makes little differences as a consequence.

E. Successful Firm Characteristics

The successful firm tends to specialize on either an industry or applications basis. Such specialization, when properly executed, results in rapid growth and profitability. Large firms typically have multiple specialization. There is no known case of a firm achieving a size in excess of $150 million without multiple specializations and/or without crossing industry segments. It is possible, however, that this may be achieved in the next 3 years by firms in the CAD/CAM subsector of the Integrated Systems segment or in services to the medical and financial industries.

Beyond the tendency to develop specializations and leverage them into other markets, the industry's successful firms possess little in the way of common characteristics except rapid growth and high margins. The management styles, backgrounds of management, financial controls and other typical "success factors" are widely variant. A claim is often made for the "high quality" of services, but quality is extremely difficult to define in a service context. Notably absent are the traditional marketing tools of advertising and market research to the extent they are employed in more mature industries.

Cost comparisons, even between directly competing services, are difficult at best because of the different capabilities and features that two services may possess. In many cases cost is not a factor of great significance in their minds of decision makers who may value perceived reliability, service levels or intangibles more greatly than lowest cost. There are no public studies extant of purchasing behavior or decision criteria. As in any service, intangibilities make up a substantial portion of the sales and subsequent continued use. Typically, the industry does not sell on cost.

F. Market Entry/Exit Barriers

Topics under this heading have been dealt with at length in other portions of this report. In essence, these factors do not have the explanatory power or significance in Information Services that they have in many other industries.

IV. INDUSTRY ENVIRONMENT

A. Federal Regulation. Please see II. B.4. for a discussion of this issue.

B. State/Local Regulation. There is not meaningful regulation of the industry at the state and local levels.

C. The industry, still with a very low "political" profile, has not been subject to legislative oversight in any specific fashion. The trade association ADAPSO is currently implementing an initiative to develop a "National Information Policy." Should this initiative be successful, there may be legislative impacts affecting the industry, but they are currently unforecastable.

D. Socioeconomic, Demographic Trends. As an industry which services businesses there is no meaningful coupling to demographic or socioeconomic factors in the sense that there are in consumer oriented products and services.

E. Consumer Issues. As in D., there is no meaningful intersection.

F. Macro-Economic Effects

1. Inflation-Deflation - As can been seen by referring to the historical growth data, the industry was essentially uninjured by inflation and its real growth most likely exceeding the inflation rate by a substantial margin. This is due in large part to the close relationship to the computer manufacturing industry where price/performance has been doubling every three to four years. The rate of performance improvement in equipment, the rate of new "product" announcement and the high rate of industry growth have, in effect, "swamped out" the effects of inflation. True deflation is not a condition yet experienced by the economy and is difficult to forecast. Under a true deflationary scenario significant economic damage is likely to occur, and will impact the industry as a substantial drop in demand for services.

2. Economic Growth vs. Industry Growth

3. Relationship to Other Industries

4. Cross-Elasticity of Demand.

These items are discussed elsewhere in this report.

G. Role of Organized Labor

So far as is known, there are no significant labor organization attempts in the industry. Occasional past attempts to organize groups such as key punch operators and computer operators have been unsuccessful. No data is available on the incidence of unionization in the industry but its white-collar nature (88.8%) suggests that unionization is nearly non-existent.

H. Share of GNP Trend. Data to be provided

I. Global Trade Position - As indicated under III. D.4.a.4, international operations do not constitute a significant portion of the industry's revenue. Services are, by nature, difficult to export, and language can be an immense barrier in dealing with complex technology. Some processing service and software firms do maintain operations in European countries. In the case of processing services, the available offerings are frequently different from those in the U.S. The services are closely related to financial, management and manufacturing practices and frequently do not "travel" well as a result. Some Remote Computing Services are used by U.S. multi-nationals to consolidate and coordinate operations, but this usage probably accounts for less than $100 million in revenue per year.

Software firms are somewhat more active internationally due to the U.S. dominance in computer technology. A variety of distribution methods are used including agents, joint ventures, distributors and wholly-owned subsidiaries. No data is currently available on these "exports" but they probably do not account for more than 10% of the sector's revenues.

With information technology becoming increasingly recognized by nations as somehow "essential" to their continuing development, it seem likely that protectionist policies will evolve to keep U.S. - based firms from achieving significant exports. A further difficulty is the low awareness of U.S. government trade negotiators and policy makers with respect to the industry's functions. In effect the industry lacks "share-of-mind" among policy makers at present. This is complicated by the great complexity of the industry's "products," and the intangibility of its services.

V. TELECOMMUNICATIONS IMPACTS

A. Telecommunications Intensity Trends - While no time series data is available, it is believed that telecommunications intensity in the services industry --particularly the processing services segment--has been increasing in fashion largely proportional to the growth of the industry on a utilization basis. This is because much of the actual delivery of services is performed via telecommunications. Revenues from the industry is increasing at a still-faster rate due to cost increases, particularly for private lines, of which this segment is a heavy user.

Continuing rapid telecommunications cost increases may have an adverse effect on the most telecomm-intensive firms with the heaviest users forced to increase prices to cover telecomm costs. This, in combination with a slowing growth rate for Remote Computing Services, may push firms into a financially weakened position with some firms believing that they face the threat of failure as a result of telecomm cost increases that they currently expect. Whether these fears are warranted is presently unknown. In any case, if true, such firms are not in a position to rapidly shift their service portfolio to less communications-dependent offerings.

If the adverse cost forecasts do, in fact, appear, then there is likely to be a long-term shift away from RCS delivery of services and more use of local processing. It is fair to say that RCS services are a development of a time when real telecomm costs were either stable or declining relative to other costs. Rapid inflation of these expenses will have the effect of encouraging a reduction of telecomm intensity in the industry over the forecast period, i.e., in the years to 1987. To the extent possible, firms will also move to adopt such bypass technology as becomes available.

Some of the larger and/or more aggressive firms are already moving in this direction.

B. Inter-Company Patterns - By definition, networks in the Information Services industry are "inter-company," i.e., the users of the service are in a different firm than the providers of the service. In the "common carrier" sense of inter-company networks, there is limited activity. At present this is primarily in the area of most modest use of electronic mail. Most industry E-mail systems are oriented toward message movement within the subscribing company, rather than between subscribing companies.

An emerging trend within the industry is to promote, through the use of industry associations, networks which supply information to many firms within an industry. The two most notable examples of this effort are IBM's insurance network and Telenet's arrangement with the American Medical Association. Both are new and current revenues are miniscule in an industry context. There is reason to believe that more arrangements of this type will occur in the future.

C. Association Relationships - There are two primary industry associations: ADAPSO and the IIA (Information Industry Association). The former is oriented toward traditional computer services firms while the latter emphasizes "content-providers" in the publishing and database industries. Further information is contained in the Appendix.

D. Network Types - The networks employed in the industry can be considered to be of the inter-segment type. Their function is to deliver information services to a broad variety of users. Almost all networks are oriented towards low speed, asynchronous data communications. There is limited common carriage, perhaps for historical and regulatory reasons. There is no meaningful integration of voice and data, perhaps because the packet-oriented nets employed for data are essentially unsuitable for joint use.

E. Key Applications - Key applications of these networks include RCS services to both an interactive and inquiry type. The growth rates for the two vary with interactive services growth somewhat slower in the past while inquiry and transaction services continue to grow rapidly.

Database inquiry services continue to grow rapidly because they are not technologically substitutable. The heavy and complex demands of large database maintenance ensures that these services are not duplicable by individual users economically.

In contrast, it is possible for many firms to duplicate interactive "problem solving" services with commercially available hardware and software. It is perceived by many that it is possible to do so at a lower cost than through the use of services. Accordingly, these types of services are growing more slowly, perhaps 9-11% during 1982. It is unclear exactly what proportion of the reduced growth is due to technological substitution and what portion is due to recessionary causes. The above is true with respect to data communications. No studies have performed regarding the industry's use of voice services but it is known that use of toll services of all types is relatively high due to the industry's pattern of maintaining large numbers of small and geographically dispersed sales offices.

F. Level of Sophistication - Topics of a related nature are discussed in detail elsewhere. In general, the level of sophistication of data communications is very high. The level of sophistication regarding voice services is uncalibrated, but is probably higher than in firms of comparable size in other industries. This is so because of the knowledge transfer possible from the data to voice disciplines and the existence of staff personnel specializing in telecommunications.

G. Network Management & Control Preferences - No studies or reliable informal information are available on this point. In general, many firms have extensive central facilities capable of operating and diagnosing datacomm networks, all of which operate on a 365 day per year, 24 hour basis. Many networks contain alternate routing and/or dial-back-up provisions and the size of the networks is such that these capabilities may be quite effective. It is known that some network operators are planning to increase maintenance staffs due to the perceived elimination of "end-to-end" Bell service post-divestiture.

H. Role of OCC's - Most major network operators extend their own nets through the use of Telenet and Tymnet. Many smaller firms rely almost exclusively on the VAN providers for their networks. It is estimated that about 1/3 of VAN revenues are derived from the Information Services Industry, although this share is shrinking as other VAN users grow faster than RCS use. No data is available on industry use of OCC voice services but some usage is known to occur.

I. Private Networking Role - In essence, this is not a very appropriate category for this industry's activities. Some industry participants (such as Tmyshare) are involved in the provision of private networks for their clients. This has not been notably successful to date. Networks are designed and facilities-managed for major industrial and financial firms using the vendor's packet technology. Telenet has been somewhat more successful with their approach to private networks. Although not normally a part of the industry as defined, they have had success in selling their packet technology to foreign governments in Europe and South America.

J. Bypass technology. As discussed elswhere in this report, there is some limited experimentation with bypass technology in the form of DTS, CATV and satellite technology, sometimes in combination. Bypass activity could increase under certain cost scenarios. Because of legislative and regulatory wild cards, the incidence of bypass in the future is extremely difficult to predict. Presently, many firms in the industry are concerned with the FCC's access charge rulings and with perceived trends in local loop costs. The technical capacity to employ bypass certainly exists at the large firms in the industry, as does the ability to innovate.

K. Critical Transport Characteristics - In a marketing sense, the two most important transport characteristics are reliability and cost. The relationships between the two are most unsettled at the present time. Within certain financial limits, reliability is the more important of the two. It must be remembered at all times that telecommunications is the delivery vehicle for information services of many types. In other words, it is a direct, frequently-the-only means of producing revenue.

Transport of data in particular is essential to the industry's well-being. It is likely that somewhat lower quality levels are tolerable in voice, and it is probable that firms experiencing cost pressures would most likely compromise the quality of voice service before data.

VI. TELECOMMUNICATIONS DECISION PROCESS

A. Organization - In general, major Information Services firms have specific portions of their technical organization dedicated to the management of telecommunications requirements. To the extent differential effort is seen, the prime efforts are in the area of data communications since this is essential to the delivery of services in the larger processing companies.

Operators of most networks have staff personnel who configure networks and design hardware and software for switching, error correction and protocol conversion. In addition, staff personnel are responsible for network diagnosis and performance measurement. Among the more sophisticated operators, automated measurements of line condition and "exercise" of processor-to-processor links is employed unavailable, but some network operators are known to be planning substantial staff increases to cope with the perceived elimination of "end-to-end" service post-divestiture.

Communications groups are most frequently a part of the operations function which also includes installation, operation and maintenance of computer systems and equipment employed by the service company. Among the more sophisticated companies, there is usually a second linkage to the finance department which monitors network operations in the context of the overall financial structure of the company.

With the increasing interest on the part of processing service firms in "leveraging" the imbedded network investment (and expenses) through the provision of VAN-like services, a tertiary linkage is formed with the sales and marketing organizations which are already in place. One fall-out effect of this new development is an increased likelihood of closer scrutiny by general management of the network function. This occurs for two reasons: 1) A VAN-like network is likely to be placed on a profit center accounting basis as opposed to overhead accounting. 2) The network's functional capabilities are likely to be viewed as "product" for the first time. It is believed that these two developments are likely to increase the "visibility" of the network function with possible impacts at the transmission facilities level. Such visibility have either positive or adverse effects to AT&T revenues, depending largely on the attitude of management and the quality of the specific network.

Office Automation does not play a material role, either from internal use or as a service provided to customers, at firms in this industry.

B. Expense Vs. Resource Vs. Need - It may be said without fear of over-emphasis that the need for communications services is intense since many firms in this industry employ these services to generate revenue directly. Aspects of this need are dealt with in detail earlier in this report.

Data presented in section II. indicates that for certain firms telecommunications expense is a major line item and may reach as much as 17% of revenues. At such firms, changes in telecomm costs will be quickly translated into very major financial impacts. In the more extreme cases, rapid escalation of these costs through the imposition of access charges, wide-spread application of measured use in LATA's or other factors can threaten the viability of the firm in the short term.

Longer term, telecomm costs may be offset by the adoption of emerging bypass technologies and the design of services which include large amounts of local processing on the user's (customer's) site. Given the high level of technological sophistication characteristic of the industry, such developments are likely. Tymshare, for example, has conducted experiments to determine the feasibility of a combination of Digital Termination Services (DTS), satellite links and local distribution through existing CATV plant. The company claims these experiments were successful. A trend toward the application of micro-processors is very much in evidence in the industry. At least nine firms have announced services which use personal computers as a part of the service as of this writing (8/83). Material revenues have not yet emerged from either micro-processor services or bypass telecomm at the present time. The current relatively high levels of activity in these areas serves to emphasize the industry's need for quality communications at reasonable (from a historical perspective) costs.

C Key Decision Makers - Under the assumption that the industry's expectation of rising telecomm costs does, in fact, occur, it may be expected that there will be increasing involvement of senior management (particularly financial and marketing) in future telecommunications decisions. In the past such decisions could be made on essentially technological criteria in a stable environment. Environmental destablization plus the expectation of rising costs will draw general management into the process since transmission services are now a critical item from both financial and "product" perspectives. This increased importance of telecommunications can have marketing and training implications for AT&T personnel assigned to these accounts. In effect, these individuals may have contact with more general management personnel within the customer firms than was previously the case.

D Technological Attitudes - As indicated earlier in this section, firms in this industry may be properly considered highly sophisticated in their attitudes toward technology. They have the means to adopt new technology when it is perceived to meet a legitimate business need such as cost reduction or enhancement of the company's service. On the other hand, firms are adverse to risking customer satisfaction through the adoption of unproven services with unknown reliability. They properly feel that their customers buy a "total" service and that these customers will be both unforgiving of low reliability and unsympathetic with explanations which suggests that problems experienced with the service are not under the control of the providing company. Accordingly, it is expected that firms in this industry will move with deliberate speed to those telecomm vendors offering a combination of low price and reliability. They are unlikely to chose a vendor based on price alone with regard to any revenue-producing service. Should telecommunications costs genuinely become a "survival" issue at some firms, it is likely that cost will then be the supreme issue with regard to transmission services.

VII. AT&T COMPETITIVE POSITION

AT&T's competitive position in this industry may be considered as strong and likely to maintain its strength into the future, particularly with the advent of new digital services likely to have high appeal in this industry. However, certain "offsetting" factors can be envisioned. Several have already been mentioned. These are:

- The industry's ability to adopt bypass technology

- The in-place trend to micro-intensive nature of the processing services sub-segment which makes it a "logical" target for competitors

- The modest current competitive intersection with industry firms supplying VAN services

  Additionally --and perhaps of over-riding significance-- is the historically adversarial component in the relationship of the "old" Bell System with firms in this industry. In short, many firms in the Information Services industry fear competition from AT&T units such as American Bell. It will therefore be important to differentiate between AT&T business units and their goals and objectives with respect to both the markets addressed and possible competitive intersections. If firms in the industry perceive (incorrectly) that there is a close relationship between AT&T's transmission services and its information services, then this perception will inhibit relationships with the transmission entity. Firms will be naturally reluctant to disclose future service plans, technical requirements and other key elements essential to success in complex technological sales. In effect, the perception of competition will chill transmission relationships.

  There is some subtlety in this point. Because of the pervasiveness of AT&T services and the perceived threat, firms will want to know intimately AT&T's possible "moves." This will be manifested in a readiness to meet, view sales presentations and hold discussions. These discussions, however, will be difficult to move to new and productive relationships due to concern on the part of firms in the industry.

Accordingly, relationships in this industry may prove to be productive of less revenue for a given effort than in other industries where there is less competitive "anxiety." We believe that this may be the single-most important competitive factor with respect to this industry, far over-riding the other four factors mentioned in this section.

To the extent that the industry mis-perceives internal AT&T relationships, it is expected that time will prove their incorrectness and the attitudes of industry firms will be modified. Until this occurs, relationships will be of a somewhat more guarded and possibly less productive nature than would otherwise occur. Efforts taken to correct mis-perceptions in this regard are definitely recommended.

AUTOMATIC DATA PROCESSING, INC.
405 Route 3
Clifton, NJ 07015
(201) 472-1000

Josh S. Weston, President
Public Company, NYSE
Total Employees: 15,000
Total Revenue, Fiscal Year End 6/30/82: $669,000,000

THE COMPANY

- Formed in 1949 as Automatic Payrolls Inc., ADP ran a payroll service on unit record equipment until 1961 when it computerized operations and went public. An ambitious acquisition program brought 75 companies (approximately) into the company as well as new business areas such as remote computing, an international network, operations in finance/banking, and services to automotive dealers. Payroll and accounting still provide the major source of ADP's revenue. In September 1981 ADP acquired the payroll processing services of Crocker National Bank. In 1982 acquisitions included Allied Financial Services, National Healthcare Administrators, and parts of Computer Statistics and Rechenzentrum Frankfurt.

- Growth has been regularly over 20% until 1982 when revenue and income grew less than at any time in the last five years.

AUTOMATIC DATA PROCESSING, INC.
FIVE-YEAR FINANCIAL SUMMARY
($ millions)

ITEM \ FISCAL YEAR	1982	1981	1980	1979	1978
Revenue	$ 669	$ 558	$ 455	$ 369	$ 296
. Percent increase from previous year	20%	23%	23%	25%	23%
Net income	$ 57.8	$49.3	$39.9	$33.5	$27.7
. Percent increase from previous year	17%	24%	19%	21%	19%

- ADP's Network Service group is the result of acquiring Cyphernetics, First Data Corporation, Time Sharing Ltd., and Information Sciences. At the time of acquisition, combined revenue was $30 million. In 1980 it was $68 million, 17% up on 1979. Sixty-five percent of revenue is from interactive processing and 35% from remote batch, on-site, and cash management services. The latter is a fast-growing segment, with 45 banks handling deposits of $2 billion per day.

- Commercial Services has always supplied more than 50% of ADP's revenue. Services include payroll, A/R, A/P, financial statement, tax return, and unemployment insurance handling.

- Financial Services contribute 10% of revenue from securities processing, interest rate futures trading, thrift institutions, and banking services. Growth was slower than in prior years due to brokerage services and banking/thrift operations.

- The dealer services division grew over 15% in 1982, providing accounting and MIS to car, truck, construction equipment, and farm equipment dealers.

INDUSTRY SECTORS SERVED

- The principal industry sectors served by ADP are:
  - Manufacturing (discrete and process).
  - Banking and finance.
  - Distribution (wholesale and retail).
  - Utilities.
  - Medical/hospital.
  - Government.

HISTORICAL GROWTH BY SEGMENT

Segment	1979 ($ millions)	1980 ($ millions)	AAGR (percent)
Commercial services	$193	$246	27%
Network services	58	68	17
Financial services	37	47	27
Special industries	77	90	17
Total	$365	$451	24%

COMPUTER SCIENCES CORPORATION
650 North Sepulveda Blvd.
El Segundo, CA 90245
(213) 615-0311

William R. Hoover, President
Public Company, NYSE
Total Employees: 14,700
Total Revenue, Fiscal Year End
4/3/83: $694,914,000

THE COMPANY

- Founded in 1959 to provide consulting services and to design/implement operating systems, compilers, and other systems software, CSC has expanded to include systems development, engineering, facilities management, turnkey computer-communications systems, communications engineering, batch processing, and network services.

- Revenue growth has been at an AAGR of 19% over the 1979-1983 period and net income at 6%. On January 29, 1982, CSC acquired Associated Credit Services for $19.9 million. In a full year ACS will add $27.8 million of revenue to CDC's Data Services group.

COMPUTER SCIENCES CORPORATION
FIVE-YEAR FINANCIAL SUMMARY
($ millions)

ITEM \ FISCAL YEAR	1983	1982	1981	1980	1979
Revenue	$ 695	$ 630	$ 601	$ 453	$ 342
. Percent increase from previous year	10%	5%	33%	32%	24%
Net income	$ 17.9	$ 17.8	$ 24.7	$ 22.7	$ 14.2
. Percent increase (decrease) from previous year	0%	(28%)	9%	60%	1%

- The substantial drop in 1982 income and flat results in 1983 were due to high costs associated with moderizing the INFONET network and a decline in Medicaid transaction volume. CSC has been largely unsuccessful in the commercial services markets.

COMPUTER SCIENCES CORPORATION

SERVICE TYPE AND DELIVERY MODE

Service Type	Percent		Revenue Value 1982 ($ millions)
• Data Services	27%		$ 152
- INFONET		$90	
- Business Services		46	
- Associated Credit*		7	
- Paid Prescriptions		9	
• Contract Services	73%		478
- Facilities Management			169
- Systems Development			309
Total	100%		$1,108

* Three months' revenue only

INDUSTRY SECTORS SERVED

	Contract Services	Data Services
• Federal Government	68%	23%
• Commercial	3%	59%
• State and Local Government	11%	less than 1%
• International	18%	18%

HISTORICAL GROWTH BY SEGMENT

Segment	1977 ($ millions)	1982 ($ millions)	AAGR (percent)
INFONET	$ 57.7	$ 90	9%
Other processing services	1.3	62	116
Facilities management	44.0	169	31
Professional services	132.0	309	19
Total	$ 235.0	$630	22%

ELECTRONIC DATA SYSTEMS
CORPORATION
7171 Forest Lane
Dallas, TX 75230
(214) 661-6000

Morton Meyerson, President
Public Company, NYSE
Total Employees: 11,500
Total Revenue, Fiscal Year End
6/30/82: $510,000,000

THE COMPANY

- Founded in 1962, EDS is the leading supplier of facilities management services to insurance companies, government funded health insurance, banking, and manufacturing. It is also a leading contender in government facilities management. Revenue growth has been at an AAGR of 28% and net income at a rate of 21% (until 1981 when it rose 31%). EDS has made five acquisitions in the last two years in minicomputer-related markets (banking software, hospital management systems, system manufacturer) and in credit union processing services. The most recent (3/82) was Data Processing of the South, N.C. On December 8, 1982, EDS received the industry's largest systems engineering and integration services contract ever awarded ($656 million, 10-year contract).

ELECTRONIC DATA SYSTEMS CORPORATION
FIVE-YEAR FINANCIAL SUMMARY
($ millions)

ITEM \ FISCAL YEAR	1982	1981	1980	1979	1978
Revenue	$510.0	$455.0	$375.0	$274.0	$218.0
. Percent increase from previous year	12%	21%	37%	26%	33%
Net income	$ 47.0	$ 37.8	$ 28.9	$ 23.7	$ 19.7
. Percent increase from previous year	24%	31%	22%	21%	20%

SERVICE TYPE AND DELIVERY MODE

- The Insurance Group, with revenue of $230 million in 1982, provides facilities management, systems installation, consulting, and turnkey systems to commercial insurance clients, Blue Cross/Blue Shield organizations in 11 states, Medicaid/Medicare to state and local governments, and processing services to hospitals, nursing homes, and other health care groups. The group is organized into four divisions (Blue Division, Commercial Insurance, Health Services, and Insurance Administration).

ELECTRONIC DATA SYSTEMS CORPORATION

HISTORICAL GROWTH BY SEGMENT

Segment	1976 ($ millions)	1982 ($ millions)	AAGR (percent)
Processing services	-	$ 54	N/A
Turnkey systems	-	3	N/A
Facilities management	$125	338	18%
Software products	-	1	N/A
Professional services	-	87	N/A
International	5	19	25
Other, including interest	3	8	18
Total	$133	$510	25%

- The Information Technology Group, with revenue of $122 million in 1982, provides the same FM, consulting, turnkey, and processing services, plus engineering service to defense and nondefense federal agencies. EDS World is a division of this group, as are Government Services and Federal Systems (VIABLE administrator group).

- The Commercial Systems Group, with revenue of $158 million in 1982, provides the same range of services to manufacturing, petroleum, transportation, distribution, and travel sectors. Processing services to the Banking/Finance sector are also provided through a Banking and Thrift division. In 1982 the Banking and Thrift division bought the Automated Customer Service division of Republic Bank Dallas and the same operation of Fidelity Bank in Oklahoma City. Cunadata, which provides credit union turnkey sysems and processing services to 2,200 credit unions is also part of the group. In 1982 the COWBOY airline reservation system was purchased from Braniff Airlines.

ELECTRONIC DATA SYSTEMS CORPORATION

INDUSTRY SECTORS SERVED

	Percent	1982 ($ millions)
Insurance	45%	$230
Banking and thrift	12	61
Industrials	5	26
Credit unions	2	10
Airline tickets	1	4
Commercial business	1	4
Government services	29	150
International	3	15
(Investments and other)	2	10

INFORMATICS GENERAL CORPORATION
21031 Ventura Boulevard
Woodland Hills, CA 91364
(213) 887-9040

Dr. Walter F. Bauer, President
Public Company, OTC
Total Employees: 2,490
Total Revenue, Fiscal Year End
12/31/82: $170,200,000

THE COMPANY

- Informatics was founded as a private company in 1962 to provide custom programming services. Equitable Life held 90% of the stock from 1974 to August 1980. The company is now owned by the public (90%) and directors/employees (10%). Over the last five years, revenue growth has been slowing noticeably, but net income has grown 15%. The main culprit is the Software Products Division, which until 1981 was growing slowly and barely breaking even while accounting for 24% of the staff. In 1981 a turnaround was achieved in this area. In 1982 the company began concentrating on vertical markets: legal information systems, insurance and financial systems, distribution and management systems, management and accounting systems, and information resources systems.

INFORMATICS GENERAL CORPORATION
FIVE-YEAR FINANCIAL SUMMARY
($ millions)

ITEM \ FISCAL YEAR	1982	1981	1980	1979	1978
Revenue	$ 170.2	$ 150.3	$ 126.0	$ 112.4	$ 92.5
. Percent increase from previous year	13%	19%	12%	21%	24%
Net income	$ 5.5	$ 5.1	$ 7.7	$ 5.1	$ 3.2
. Percent increase (decrease) from previous year	8%	(34%)	51%	59%	246%

SERVICE TYPE AND DELIVERY MODE

- There are three operational divisions:
  - The Software Products segment develops, purchases, and markets implementation systems and applications products.

- The Information Processing Services segment offers timesharing, manual and automated data bases, and document handling systems.
- The Professional Services segment serves government (mainly) and commercial clients.

INDUSTRY SECTORS SERVED

- The principal industry sectors served are, as a percent of revenue:

	1978	1982
- U.S. Government		
. Software products	1%	1%
. Professional services	12	7
. Processing services	10	9
- Commercial and Other		
. Software products	34	39
. Professional services	18	18
. Processing services	25	26

HISTORICAL GROWTH BY SEGMENT

Segment	1976 ($ millions)	1982 ($ millions)	AAGR (percent)
Software products	$21.5	$68.0	21%
Information processing	16.2	60.3	25
Professional services	21.6	42.4	12

Note: Divisional revenue includes intersegment revenue, not broken out separately.

NATIONAL DATA CORPORATION
One National Data Plaza
Corporate Square
Atlanta, GA 30329
(404) 329-8500

L. C. Whitney, President and CEO
Public Corporation, OTC
Total Employees: 2,458
Total Revenue, Fiscal Year End
5/31/82: $120,325,000

THE COMPANY

- National Data Corporation (NDC) was incorporated in 1967 in Delaware to provide specialized data processing and facilities management services. NDC provides cash management, credit card, merchandising, health care, information management processing, and professional services. Its facilities management services include all phases of credit card billing, from credit approval through collections.

- In the first nine months of fiscal 1983, NDC reported revenue of $89,886,000 and net income of $7,936,000 versus $90,160,000 and $8,442,000 for the nine month period of fiscal 1982. The main reason for the flat revenue and 6% profit drop was the loss of the ARCO contract, which would have contributed $7 million.

NDC
FIVE-YEAR FINANCIAL SUMMARY
($ thousands, except per share data)

ITEM \ FISCAL YEAR	5/82	5/81	5/80	5/79	5/78
Revenue	$ 120,325	$ 96,519	$ 81,050	$ 68,321	$ 57,027
. Percent increase from previous year	25%	19%	19%	20%	-
Net income	$ 11,224	$ 8,140	$ 6,827	N/A	N/A
. Percent increase from previous year	38%	19%	-		

NATIONAL DATA CORPORATION

HISTORICAL GROWTH BY SEGMENT

	5/82	Percent Increase (Decrease) from Previous Year	5/81	Percent Increase (Decrease) from Previous Year	5/80
Data Processing Services					
- Cash Management	$ 29,466	26%	$23,291	42%	$16,448
- Credit Card	28,961	45	19,905	30	15,281
- Information Services	32,555	20	27,116	6	25,686
- Merchandising	4,998	6	4,718	(8)	5,119
- Health Care	6,258	53	4,082	30	3,128
- Miscellaneous	430	(70)	1,455	58	918
Subtotal	$ 102,668		$80,667		$66,580
Facilities Management					
- ARCO	$ 12,410	9%	$11,349	2%	$11,075
- Other	5,247	17	4,503	33	3,395
Subtotal	$ 17,657		$15,852		$14,470
Total Company Revenue	$ 120,325		$96,519		$81,050

QUOTRON SYSTEMS, INC.
5454 Beethoven Blvd.
Los Angeles, CA 90066
(213) 827-4600

Milton E. Mohr, President
Public Corporation, OTC
Total Employees: 858
Total Revenue, Fiscal Year End
12/31/82: $120,918,000
Computer Services Revenue
$110,436,000

THE COMPANY

- Founded in 1957, Quotron Systems, Inc. provides financial information services to 4,800 customer locations for a monthly fee through a private nationwide data communications network (CARS) to brokerage firms, banks, insurance companies, and security, option, and commodity exchanges. The Quotron 800 system will be gradually replaced by the Motorola 68000-based Quotron 1000 system that is UNIX-based.

QUOTRON SYSTEMS, INC.
FIVE-YEAR FINANCIAL SUMMARY
($ thousands, except per share data)

ITEM \ FISCAL YEAR	1982	1981	1980	1979	1978
Revenue	$120,918	$88,120	$63,809	$47,415	$39,379
. Percent increase from previous year	37%	38%	35%	20%	18%
Net income	$ 17,035	$12,485	$ 8,909	$ 7,017	$ 4,470
. Percent increase from previous year	36%	40%	27%	57%	(8%)

HISTORICAL GROWTH BY SEGMENT

- Ninety-one percent of Quotron's fiscal year 1982 total revenue is related to computer services. Of the computer services revenue, 93% is interactive processing (data base inquiry), 2% is derived from professional services, and 5% from the joint venture with American Telephone and Telegraph.

QUOTRON SYSTEMS, INC.

Segment	1978 ($ millions)	1982 ($ millions)	AAGR (percent)
Processing services	$33.8	$ 98.5	31%
Professional services	0.2	2.0	78
Other	2.0	9.9	49
Total	$36.0	$110.4	32%

SHARED MEDICAL SYSTEMS
650 Park Avenue
King of Prussia, PA 19406
(215) 265-7600

Harvey J. Wilson, President
Public Company, OTC
Total Employees: 1,919
Total Revenue, Fiscal Year End
12/31/82: $165,800,000

THE COMPANY

- Formed in 1969 to provide information services to the hospital industry by former IBM marketing staff engaged in selling in-house systems to that market, SMS became a public corporation in 1976.

- SMS is the largest vendor to the hospital industry offering remote computing and minicomputer-based services and has produced a revenue AAGR of 27% over the 1978-1982 period. Net income grew by the equivalent AAGR of 26%.

SHARED MEDICAL SYSTEMS
FIVE-YEAR FINANCIAL SUMMARY
($ millions)

ITEM \ FISCAL YEAR	1982	1981	1980	1979	1978
Revenue	$ 165.8	$ 131.6	$ 106.6	$ 82.8	$ 63.1
. Percent increase from previous year	26%	24%	29%	31%	38%
Net income	$ 21.4	$ 16.6	$ 13.3	$ 10.8	$ 8.6
. Percent increase from previous year	29%	25%	23%	25%	27%

SERVICE TYPE AND DELIVERY MODE

- Processing services provide the basic accounting applications required by hospitals through batch and interactive modes. Seventy-five percent of the hospitals served use the interactive mode.

- Minicomputer-based turnkey systems are offered for hospitals requiring standalone capabilities. Most use it as an entry node to the network, however.

- During 1980 a new group practices Physicians Service System (turnkey) was introduced. In 1981 the Nursing System was announced offering productivity tools, interhospital communications, station personnel planning, and education/training services. In 1982 SMS introduced a Laboratory System and the attachment of personal computers to the SMS network.

SHARED MEDICAL SYSTEMS

HISTORICAL GROWTH BY SEGMENT

Segment	1976 ($ millions)	1982 ($ millions)	AAGR (percent)
Processing services	$31.9	$143.2	28%
Turnkey systems	1.7	19.2	50
Maintenance and repairs	1.9	3.4	10
Total	$35.5	$165.8	29%

TYMSHARE, INC.
20705 Valley Green Drive
Cupertino, CA 95014
(408) 446-6000

Thomas J. O'Rourke, President
Public Company, NYSE
Total Employees: 3,500
Total Revenue, Fiscal Year End
12/31/82: $297,000,000

THE COMPANY

- Since its founding in 1966, Tymshare has evolved from a remote computing services company specializing in scientific/engineering applications into a multiservice vendor providing data communications services, TK systems, software products, consulting, and third-party maintenance services, as well as processing services. Growth has been achieved primarily through acquisitions that have permitted entry into specialized, competitive markets such as medical systems, electronic funds transfer and other banking services, microwave transmission, and international markets such as the U.K., France, West Germany, and Japan.

TYMSHARE, INC.
FIVE-YEAR FINANCIAL SUMMARY
($ millions)

ITEM \ FISCAL YEAR	1982	1981	1980	1979	1978
Revenue	$297	$ 290	$235.9	$193.1	$149.6
. Percent increase from previous year	2%	23%	22%	29%	48%
Net income	$8.8	$ 15.7	$ 18.7	$ 14.6	$ 10.6
. Percent increase (decrease) from previous year	(44%)	(16%)	28%	38%	32%

SERVICE TYPE AND DELIVERY MODE

Service Type	Percent	Revenue Value 1982 ($ millions)
Processing services	68%	$202
Software products	2	6
Professional services	3	9
Turnkey systems	3	9
Hardware (sales and rentals)	8	24
Tymnet	14	42
Other	2	5
	100%	$297

INDUSTRY SECTORS SERVED

Banking and finance	16%
Services	27
Manufacturing	22
Utilities	11
Government	11
Medical	8
Distribution	5
	100%

HISTORICAL GROWTH BY SEGMENT

Segment	1976 ($ millions)	1982 ($ millions)	AAGR (percent)
• Processing services	$67.9	$202	20%
• Software products	1.6	6	25
• Professional services	0.8	9	50
• Turnkey systems	-	9	N/A
• Hardware (sales and rental)	4.1	24	34%
• Tymnet	4.1	42	47%
• Other	3.3	5	7%
Total	$81.8	$297	24%

INPUT